South River Programmatic Restoration Environmental Assessment

Bureau of Land Management
South River Field Office
Roseburg District

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Chapter 1
PURPOSE AND NEED FOR ACTION

This chapter describes the purpose and need for the action(s) being proposed and analyzed in this environmental assessment (EA).

I. Background

The Roseburg District, Bureau of Land Management (BLM) plays a key role in aquatic and riparian restoration activities presently underway in the Umpqua River Basin. Because of the interspersed, checkerboard ownership pattern of the revested Oregon & California Railroad lands, the District works closely with public and private partners to plan restoration projects that will benefit resources across ownership boundaries.

There is a substantial pool of financial resources available to conduct restoration and rehabilitation projects, both on and off Federal lands. Funds for such work are presently available through Title II of the Secure Rural Schools and Community Self-Determination Act (a.k.a. County Payments Act), the Northwest Economic Adjustment Initiative (a.k.a. Jobs-In-The-Woods), annual appropriations and other funding sources. The Wyden Amendment[1] also gives Federal agencies the authority to spend Federal funds on non-federal lands when there would be a tangible benefit to resources on Federal land. Whether from these or other sources, the BLM expects that there will be continued funding for restoration efforts.

Watershed restoration is addressed in the Roseburg District *Record of Decision and Resource Management Plan* (USDI, BLM 1995a (ROD/RMP)) as one of the four components of the Northwest Forest Plan's Aquatic Conservation Strategy (ACS). The primary objective of the ACS is the restoration and maintenance of the ecological health of watersheds and aquatic ecosystems contained within them on public lands.

The ROD/RMP (p. 21) states "Watershed restoration will be an integral part of a program to aid recovery of fish habitat, riparian habitat, and water quality. The most important components of a restoration program are control and prevention of road-related runoff and sediment production, restoration of the condition of riparian vegetation, and restoration of in-stream habitat complexity."

Specific management direction for watershed restoration includes (ROD/RMP, p. 21):

- Prepare watershed analyses and plans prior to restoration activities.

[1] *The Ominbus Consolidated Appropriations Act of 1997, Wyden Amendment, (Public Law 104-208, Section 124)* states, "appropriations made for the BLM may be used by the Secretary of the Interior for the purpose of entering into cooperative agreements with willing private landowners for restoration and enhancements of fish, wildlife, and other biotic resources on public or private land or both the benefit these resources on public lands within the watershed."

- Focus watershed restoration on removing some roads and, where needed, upgrading those that remain in the system.

- Apply silvicultural treatments to restore large conifers in Riparian Reserves.

- Restore stream channel complexity. In-stream structures will only be used in the short term and not as a mitigation measure.

Watershed analysis has been completed for each 5th field watershed in the South River Resource Area. Second iterations of watershed analysis have been completed for the Myrtle Creek, Lower Cow Creek, and South Umpqua River watersheds. Water Quality Restoration Plans (WQRPs) for these three watersheds and the Olalla Creek-Lookingglass Creek watershed have been completed and submitted to the Oregon Department of Environmental Quality (ODEQ) for approval. These documents are available for public examination at the Roseburg District Office, 777 NW Garden Valley Blvd., Roseburg, Oregon.

II. Purpose

The purpose of this analysis is to assess the consequences of implementing a restoration program within the South River Resource Area. The analysis considers specific project proposals that have already been identified, as well as activities of a programmatic nature that would also be pursued, as they are identified, over a period of five to ten years.

Restoration projects would help to accelerate the recovery of previously disturbed riparian forests; improve water quality; re-establish access for fish to historically available habitat; and restore and enhance the complexity of aquatic habitats.

A programmatic approach provides for a more comprehensive description and analysis of cumulative effects, and more efficient planning efforts. The restoration activities proposed would fall into three basic categories: (1) non-commercial riparian vegetation treatments, (2) stream crossing replacement/removal, road improvements and road decommissioning, and (3) stream restoration projects.

The EA will address the environmental consequences of the alternatives, and establish sideboards by which to consider and/or measure the scope, magnitude, context and intensity of environmental effects resulting from the projects currently proposed and others that may be identified in the future. It will provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement (EIS) or a finding of no significant impact (FONSI). It will also consider the consistency of the environmental consequences with the analysis of impacts contained in the *Roseburg District Proposed Resource Management Plan/Environmental Impact Statement* (USDI, BLM 1994 (PRMP/EIS)).

III. Need

The need for watershed restoration is described in the ROD/RMP, watershed analyses, the Roseburg District Restoration Strategy and Action Plan (USDI, BLM 2003a), and the South River Aquatic Restoration Planning Assessment (USDI, BLM 2003b). Watershed restoration projects are needed to meet the objectives of the ACS and management direction from the ROD/RMP that includes:

- Restoration of the condition of riparian vegetation, control and prevention of road related runoff and sediment production, and restoration of instream habitat complexity (ROD/RMP, p. 21).

- Maintenance and restoration of the species composition and structural diversity of plant communities in riparian zones and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability (ROD/RMP, p. 20).

- As identified through watershed analysis, rehabilitation of streams and other waters to enhance natural populations of anadromous and resident fish. Possible rehabilitation measures will include, but not be limited to, fish passage improvements, instream structures using boulders and log placement to create spawning and rearing habitat, placement of fine and coarse materials for over-wintering habitat, and riparian rehabilitation to establish or release existing coniferous trees (ROD/RMP, p. 40).

There is a need for restoration projects to meet the responsibility of the Secretary of the Interior, under Title II of the "Secure Rural Schools and Community Self-Determination Act of 2000" to approve the use of funds reserved by an eligible county under paragraph (1)(B)(i) of the Act "…for the purpose of entering into and implementing cooperative agreements with willing Federal agencies, State and local governments, private and non-profit entities, and landowners for protection, restoration, and enhancement of fish and wildlife habitat, and other resource objectives consistent with the purposed of this title on Federal land and on non-Federal land where projects would benefit these resources on Federal land."

The development of community partnerships is needed to achieve large-scale restoration objectives and is encouraged by the BLM National Strategic Plan which provides direction to "restore and maintain the health of the land and promote collaborative management through restoration activities." (USDI, BLM 1997).

There is a need for the restoration projects to achieve the goals of the Roseburg District Restoration Strategy. Among these goals are (1) integration of restoration plans with those of our partners and (2) pursuit of restoration activities in high and moderate priority watersheds (USDI, BLM 2003a – District Restoration Strategy). While this EA does not analyze any specific partnered activities at this time, they are not out of the realm for future consideration and potential implementation.

Implementation of projects on Federal lands would conform to the Management Action/Direction of the ROD/RMP which incorporates the standards and guidelines of the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA, USDI 1994b (ROD))., as amended by the *Record of Decision to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA, USDI 2004a), and the *Record of Decision to Clarify Provisions Relating to the Aquatic Conservation Strategy* (USDA, USDI 2004b).

The ROD/RMP incorporates the analysis contained in the PRMP/EIS which is tiered to the analysis contained in the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Related Species Within the Range of the Northern Spotted Owl* (USDA, USDI 1994a (FSEIS)), commonly known as the Northwest Forest Plan.

Any projects implemented on private lands not within rights-of-way or easements controlled by the BLM would be conducted in accordance with all State and local regulations, including but not limited to those of the Oregon State Division of Lands, Oregon Department of Forestry, Oregon Department of Fish and Wildlife, and Oregon Department of Agriculture.

Chapter 2
DESCRIPTION OF ALTERNATIVES

This chapter describes basic features of the alternatives analyzed in this document.

I. Alternative One - No Action

Under this alternative, the South River Field Office would not pursue any of the programmatic restoration actions proposed in this analysis.

Riparian forest stands would not receive pre-commercial treatments as part of an integrated restoration effort. Any future treatments would be limited to pre-commercial thinning as a part of regular silvicultural management.

There would be no tree-lining of stream banks, or in-stream placement of logs to improve aquatic habitat conditions, stream function, and water quality.

There would be no integrated program of road improvements to reduce erosion and sediment problems. There would be no road decommissioning to reduce road density, reduce sediment and reduce flow routing.

Actions undertaken would only address the highest priority erosion and water quality concerns, maintenance of infrastructure, and elimination of high risks to public safety associated with the potential failure of roads and culverts. These actions are anticipated to include the improvement or decommissioning of 10-14 miles of road, and replacement of seven stream-crossing culverts over the next ten years. Implementation of these projects would be accomplished under separate authorization.

II. Alternative Two - Proposed Action

Under this alternative, a broad range of watershed restoration actions would be undertaken, grouped into the categories described below. Candidate projects are identified in Appendix B that would be implemented over an initial period of 5-to-10 years. Projects of a similar nature which may be identified in the future would be assessed against the effects analysis contained in this document and if found to be consistent with those already described, authorized by a Determination of NEPA Adequacy which would document that consistency.

Best Management Practices and Project Design Features would be implemented in conjunction with actions to mitigate identified impacts to the environment, and insure that the environmental effects are within the scope of those considered and accepted in the Roseburg District PRMP/EIS.

A. Riparian Projects

These would consist of non-commercial silvicultural treatments in Riparian Reserves within the Matrix, and riparian areas within the Late-Successional Reserves (LSR), undertaken separately from riparian density management conducted in conjunction with commercial thinning and LSR density management. Potential acreage available for treatment is displayed in Table 2 (p. 11) Projects would include:

- Pre-commercial thinning to reduce stand density
- Girdling to create small snags and coarse down wood
- Conversion of alder dominated stands to stands composed of a mixture of conifers and longer-lived hardwood species.

Riparian treatments would be applied along fish-bearing streams that are 3^{rd}-order or larger. The objectives would include the creation of more species-diverse stands that would provide long-term benefits of stream shading, large wood recruitment, organic litter, and root strength for stream bank stability. A map of potential project areas is contained in Appendix A.

Four criteria would be used to select potential project areas. Candidate stands must be between 30 and 60 years old, and have an average (quadratic mean) tree diameter generally less than eight inches, although some areas within a stand may exceed this, especially where a significant alder component is present. In addition, one of the following two criteria must be met: the stand is dominated by conifers and the relative density index[2] is greater than 0.45; or the stand is dominated by red alder and lacks the potential for the establishment of desirable tree species (mixed conifers and hardwoods).

B. Stream Restoration Projects

These projects would be designed to improve water quality and stream habitat conditions including:

- Placement of log structures to create in-stream and off-channel habitat that would benefit fish and other aquatic fauna.
- Placement of boulders and weir structures for control of stream grade and flow velocity.

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[2] *relative density index*, or RDI (Hann and Wang 1990) indicates the overall inter-tree competition for available site resources within a stand. Competition induced mortality in predominantly Douglas-fir stands occurs when RDI exceeds approximately 0.65. Douglas-fir stands should be managed to maintain an RDI of between 0.40 and 0.65, where high rates of overstory growth and vigor are desired. Thinning to and maintaining RDI from ≤ 0.25 to 0.45 maximizes individual tree growth and the potential for understory development. (Curtis and Marshall 1986; Hayes et al. 1997).

- Tree-lining to stabilize stream banks, reduce erosion, and promote meander and floodplain development.

The projects would be primarily implemented in streams that are historically habitat for anadromous fish, but implementation of projects in streams occupied only by native, resident fish species would not be precluded. Nineteen potential project locations are identified in Appendix B, representing approximately 14 miles of stream habitat located primarily in the South Umpqua River, Lower Cow Creek, Myrtle Creek, and Olalla Creek-Lookingglass Creek watersheds.

In selecting stream reaches for habitat restoration, the following criteria were used:

- The stream was recommended for instream habitat improvement in the ROD/RMP (p. 87).

- The stream was identified in aquatic habitat surveys by the Oregon Department of Fish and Wildlife (ODFW) as deficient in spawning gravel and/or large woody debris.

- The stream is listed by the Oregon Department of Environmental Quality as water quality limited for exceeding temperature standards.

- There is unique knowledge on the size and health of fish populations.

- There is unique knowledge of overall habitat conditions.

- Access to stream reaches is readily available.

- Nearby riparian corridors have a sufficient number of large trees to complete the project without degrading wildlife habitat or late-successional riparian forest conditions.

Foster et al. (2001) recommend one key piece per 100 meters, equal to 48 per mile, as the desired condition. A key piece is defined as greater than 60 cm diameter and greater than or equal to 10 meters in length. NOAA Fisheries considers a level of 80 pieces per mile as *properly functioning* (USDC NMFS 1996). For purpose of this analysis, 60 to 80 trees per mile is considered the approximate number of trees necessary to provide the desired number of key pieces, since a single tree may provide more than one key piece. For the potential projects already indicated, 900 to 1,200 trees in the range of 18-30 inches diameter at breast height (dbh) would be removed from the riparian corridors alongside the project streams.

C. Road and Culvert Projects

These projects would include road improvements, road closures or decommissioning, and the replacement of stream-crossing culverts.

Projects would be implemented in drainages where streams have identified sediment problems, with most identified projects in the South Umpqua River and Myrtle Creek watersheds as illustrated in Table 1.

Table 1 - Potential Road Treatment and Culvert Replacement Projects Available Within 5 to 10 Years

Project Type	5th Field Watersheds in the South River Resource Area							
	South Umpqua River	**Lower South Umpqua**	**Deadman/ Dompier**	**Lower Cow Creek**	**Myrtle Creek**	**Olalla Creek - Lookingglass Creek**	**Middle South Umpqua River**	**Upper Middle Fork Coquille**
Culvert Replacements	7	1	1	4	6	4	5*	4
Road Improvement (miles)	16.9	1.0	4.0	6.0	28.7	2.4	0.5	10.0
Road Decommission (miles)	19.1	-	-	-	1.4	-	-	-

* includes one culvert planned for removal in the Middle South Umpqua River watershed

Project locations and factors are further described in Appendix B.

Road Improvements

Potential road improvements, identified in Appendix B, would be designed to reduce erosion of road surfaces, cut banks and fill slopes, and the production of sediment, primarily by correcting surfacing deficiencies and road drainage problems.

Projects selected would meet at least one of the following criteria: the road was identified through watershed analysis as a localized sediment source; the road is located in close proximity, generally 200 feet or less, to a stream having excess fine sediment, defined as greater than 12 percent fines in riffles (Foster et al. 2001); the stream is identified as embedded with fine sediment to an extent that aquatic life may be impaired; or the stream was identified by the BLM planning process as a restoration priority.

Natural surfaced roads would be provided with initial aggregate surfacing that is resistant to high rates of erosion, and rocked roads with additional aggregate to supplement existing surfacing. Exposed cut banks and fill slopes would be seeded and mulched. Energy dissipators would be installed at the outfall of cross-drain culverts to prevent erosion of fill slopes.

Drainage improvements would be designed to disperse runoff evenly across the landscape, instead of concentrating intercepted flows and delivering sediment-laden water directly into stream channels. This would be accomplished by: reshaping road crowns; installing additional cross-drain structures (i.e. water dips, relief culverts, water bars); cleaning and regrading ditches; and out-sloping road surfaces.

Road Decommissioning

Subject to the agreement of private parties holding access rights under reciprocal rights-of-way agreements, selected roads would be decommissioned. This could be either for the long term, more than five years, or permanent and full decommissioning.

The objectives of decommissioning would be to: reduce soil erosion; improve water quality by reducing sedimentation arising from excess erosion of road surfaces, cuts and fills; restore normal infiltration and stream flow regimes; reduce impacts to fish and aquatic habitat associated with sedimentation; reduce disturbance to wildlife, wildlife habitat, and botanical resources; and reduce road maintenance costs.

For long-term decommissioning, roads would be closed to vehicular use, but would be retained for potential future use. They would be placed in an "erosion-resistant" condition by providing ample cross-drainage, eliminating diversion potential at stream crossings, and stabilizing or removing fill materials.

Full decommissioning could include: removal of all cross-drain and stream-crossing culverts; pull-back of fill material at stream crossings; removal of unstable fills; sub-soiling of the road bed; seeding and mulching of disturbed areas; and reestablishment of native vegetation and trees.

The objectives of decommissioning would be to: reduce soil erosion; improve water quality by reducing sedimentation arising from excess erosion; restore normal hydrological processes associated with infiltration and stream flow; reduce impacts to fish and aquatic habitat associated with sedimentation; reduce total road maintenance cost, and reduce impacts to fish, wildlife habitat, botanical resources, and other resources.

Culvert Replacement

Stream-crossing culverts would be replaced that are barriers to upstream and downstream passage by adult and juvenile, resident and anadromous fish and other aquatic fauna. The culverts may also be sediment sources because they are perched and are down-cutting stream banks and channels at the culvert outfall.

Criteria used to select culverts for replacement would include:

- The existing culvert blocks access to habitat in the daily movement and seasonal migration of anadromous and resident native fish species.

- The culvert is aged and at a high risk of failure in the near term.

- The culvert is a threat to public safety and private property due to risk of failure.

Existing culverts would be replaced with pre-cast concrete spans, open-arched pipes, or round culverts set below the level of the stream bed. These replacements would be sized to greater than bankfull width and designed to pass a theoretical 100-year flood event. Where necessary to prevent channel down-cutting or provide a gradient sufficient shallow to insure fish passage, grade control structures such as weirs would be incorporated into the project designs.

III. Alternatives Considered but Eliminated from Detailed Analysis

Projects such as riparian fencing, implemented on privately-owned lands in partnership with the BLM and BLM funding, were not considered in this analysis for the following reasons. The number and scope of such projects cannot be accurately determined, and projects of this type are categorically excluded from NEPA and would be implemented under other authorization.

Alternatives that include commercial silviculture treatments in Riparian Reserves and riparian areas were not addressed because they would be considered under separate analyses in association with commercial thinning and density management actions.

IV. Resources that Would Remain Unaffected by Either Alternative

The following resources would not be affected by either alternative, because they are absent from the area: wilderness; waste, solid or hazardous; and Wild and Scenic Rivers.

There are approximately 1,900 acres of prime farmland inventoried on BLM-managed lands within the South River Resource Area. If present at project sites, they would be managed in accordance with state and local governmental policies to the extent practicable.

No restoration actions would be implemented in Areas of Critical Environmental Concern.

The proposed action is consistent with Executive Order 12898 which addresses Environmental Justice in minority and low-income populations. The BLM has not identified any impacts to low-income or minority populations, either internally or through the public involvement process.

No Native American religious concerns were identified by the team or through correspondence with local and tribal governments.

As discussed in this document, cultural resources would not be affected, and no measurable increase or decrease on the introduction or rate of spread of noxious weeds is anticipated.

The BLM is required to consider the impacts of management actions on National Energy Policy (Executive Order 13212). No commercially usable energy sources are known to exist in the resource area. There are no energy production or conversion facilities. No permits or rights-of-way for geothermal, solar or wind power generation exist. While there are electrical transmission and pipeline rights-of-way in the resource area, they would not be affected by either alternative.

Chapter 3
AFFECTED ENVIRONMENT

This chapter summarizes the specific resources, present or potentially present, which could be affected by the alternatives identified in this analysis. Tables in Appendix C summarize resource information, by 5th field watershed, relevant to the affected environment that was considered in this analysis.

I. Vegetation

Forest stands proposed for treatment are in the stem exclusion stage. This stage of stand development is characterized by full occupancy of the existing growing space, to the exclusion of establishment of new plants (Oliver and Larson 1990). Stands are generally dense and even-aged, from 30 to 60-years old, but beyond the optimum age for conventional precommercial thinning treatments (Reukema 1975). Tree species composition varies from site to site, but Douglas-fir and/or red alder are usually canopy dominant. Red-alder dominance is generally greatest immediately adjacent to stream channels.

At this stage of stand development, shrubs and herbaceous species are generally sparse because tree density and high canopy closure limits the amount of sunlight that reaches the forest floor to the extent that it is insufficient for germination and survival. Conifers and/or hardwoods may exist in a lower canopy layer, but growth rates are usually exceedingly low due to overstory suppression.

Table 2 displays, by watershed, the approximate acres of riparian forest stands that reflect the conditions and characteristics described above. These figures represent a theoretical maximum, but not all of these acres would be suitable for treatments. Many acres have already been analyzed for density management in association with commercial vegetation treatments. Other stands exceed the diameter limitations described in Chapter 2 (p. 6) and would be candidates for treatment under an early commercial prescription or traditional commercial thinning/density management.

Table 2 - Potential Riparian Vegetation Treatment Acres by Watershed

Stand Type	Acres By Fifth Field Watersheds in the South River Resource Area								
	South Umpqua River	Lower South Umpqua	Lower Cow Creek	Myrtle Creek	Deadman/Dompier	Olalla Creek Lookingglass Creek	Middle South Umpqua	Upper Middle Fork Coquille	Totals
Previously Thinned	710	50	531	689	74	536	138	323	3,051
Not Previously Thinned	1,763	4	633	641	329	475	234	417	4,496
TOTAL	2,473	54	1,164	1,330	403	1,011	372	740	7,547

II. Fish and Aquatic Habitat

A. Aquatic Habitat Conditions

A general description of aquatic habitat conditions is provided for those streams identified in Appendix B as potential "Stream Enhancement" projects. The descriptions are based on ODFW aquatic habitat inventories, where available, and the professional judgment of BLM biologists. Aquatic Habitat Ratings, contained in Appendix C, are based the ODFW aquatic habitat inventories.

Habitat in the identified streams is generally less than optimal for salmonid rearing and spawning. The streams have low amounts of large woody debris, as contrasted to the habitat benchmarks recommended by ODFW. Large woody debris provides habitat complexity, helps to retain and store gravel substrate, and creates deep pool and off channel rearing habitat (Bjornn and Reiser 1991). This deficiency in large woody debris is most often the result of clearing of riparian forest in lowlands for agricultural purposes, stream cleaning, and timber harvest in riparian areas that has reduced the amount of wood available for stream recruitment.

The identified streams had high levels, exceeding 12 percent, of fine sediment in combination with low amounts, less than 35 percent, gravels. Many streams exhibit long sections of bedrock dominated substrate. Under these conditions, spawning substrates are either embedded with fine sediments or almost entirely absent.

Access for many reaches of historic habitat is severely restricted. High outlet jumps, high water velocity, and shallow outlet pools, associated with culverts identified in Appendix B all contribute to impassable conditions during part or all of the year.

B. Special Status Species

Salmonid species found in watersheds in the South River Resource Area include winter-run Oregon Coast steelhead trout and resident rainbow trout (*Oncorynchus mykiss*), resident and sea-run Coastal cutthroat trout (*Oncorynchus clarki clarki*), fall and spring Oregon Coast chinook salmon (*Oncorynchus tshawytscha*), and the Oregon Coast coho salmon (*Oncorynchus kisutch*).

Threatened Species

At present, there are no species designated as threatened. The National Marine Fisheries Service had previously designated the Oregon Coast coho salmon Evolutionary Significant Unit (ESU) as threatened, in 1998 (Federal Register 1998b Vol. 63/No. 153). A ruling in February, 2004, by the 9th Circuit Court of Appeals upheld a September, 2001, ruling by District Judge Michael Hogan which set aside the threatened status of Oregon Coast coho salmon and removed any protections under the ESA.

Candidate Species

The Oregon Coast steelhead trout Evolutionary Significant Unit (ESU) was proposed as a candidate for threatened species designation in 1998 (Federal Register 1998a Vol. 63/No. 53). To date, there has been no change in the status of the steelhead trout.

Bureau Sensitive and Bureau Assessment Species

The Umpqua chub (*Oregonichthys kalawatseti)* is a Bureau Sensitive Species. Umpqua chub are restricted to the mainstem of the Umpqua River and are not present in any of the immediate project areas.

The Pacific lamprey (*Lampetra tridentate)* is a Bureau Assessment Species that can be found in small 3rd order or larger tributaries of the South Umpqua River. Although its distribution is largely unknown, its presence is suspected in streams inhabited by coho salmon.

Bureau Tracking

The Umpqua River cutthroat trout was once considered a unique ESU, but was later merged with the broader Coastal cutthroat trout ESU and delisted (Federal Register 2000 Vol. 65/No. 81). It is considered a Bureau Tracking species with both anadromous and resident members of the species found in 3rd order and larger tributaries of the Umpqua River, including streams above anadromous barriers.

C. Essential Fish Habitat

Streams and habitat that are currently or were historically accessible to chinook and coho salmon are considered Essential Fish Habitat. Essential Fish Habitat is designated for fish species of commercial importance by the Magnuson-Stevens Fishery Conservation and Management Act of 1996 (Federal Register 2002, Vol. 67/No. 12).

In the South River Resource Area, the limits of Essential Fish Habitat are primarily associated with the distribution limits for coho salmon. It is present in all watersheds except the portion of the Middle Fork Coquille watershed on the western edge of the resource area, where a natural waterfall below the confluence of Middle Fork Coquille River and Twelvemile Creek blocks further upstream migration by coho salmon.

III. Water Quality

Water quality standards are determined for each water body by the ODEQ. Water bodies not meeting these standards are placed on the Water Quality Limited 303(d) list (ODEQ 2002).

The only water quality standards that would be potentially affected by the proposed restoration projects are water temperature and sediment.

Water temperature

Many streams in the South River Resource Area are listed by ODEQ for exceeding water temperature standards. Elevated water temperatures may be the result from a variety of actions and factors. The most prevalent is the removal of streamside vegetation and timber that provides shade, resulting in the exposure of the stream channel to direct solar radiation and heating. The loss of pools and off-channel habitat leads to the loss of stored reserves of water which would otherwise help to moderate temperatures during periods of low summer flows. Wide and shallow channels that are scoured to bedrock also increase the susceptibility to excess heating.

Sediment

No streams within the South River RA are listed for excess fine sediment, but observations by BLM personnel and aquatic habitat surveys by ODFW indicate that many streams are impaired by embedded sediments. Sources of sediment, other than from natural erosion processes, are most frequently associated with roads and culverts.

Roads, particularly those that are unsurfaced, are subject to surface erosion and sedimentation of nearby waterways. In the absence of sufficient cross-drain culverts or out-sloping of road surfaces, ditch lines have been found to route sediment laden water from road surfaces and ditches directly into active streams.

Culverts at stream crossings are also a potential source of sediment. Improperly installed or aligned culverts can cause down cutting of stream channels and banks at the outflow. Seepage beneath improperly installed or failing culverts can also erode and undermine fill material resulting in sedimentation (USDI BLM Coos Bay District 1998a).

IV. Wildlife

A. Special Status Species

Species of considered special status species are those listed as threatened or endangered under the Endangered Species Act of 1973, as amended; candidate or proposed species for listing under the Act; or designated as Bureau Sensitive or Bureau Assessment species under the Oregon/Washington BLM 6840 policy. Appendix D presents the current list of species and associated habitat features. Of this list, only species considered using habitat types preferred by the species and present in the restoration project areas would be considered for discussion.

1. ESA Species

There are no endangered, candidate or proposed terrestrial species on the Roseburg District. Federally-threatened species confirmed in the South River Resource Area include the northern spotted owl (*Strix occidentalis caurina*), the marbled murrelet (*Brachyramphus marmoratus*), and the bald eagle (*Halieaeetus leucocephalus)*.

Northern Spotted Owl

Suitable nesting, roosting and foraging habitat (NFR) for the spotted owl is present throughout all watersheds in the South River Resource Area. It is generally characterized by stands with large conifer trees that have large diameter broken and unbroken limbs, deformities, and large broken tops or cavities which provide nesting sites (local field data; Forsman et al.1984; Hershey 1995; Forsman and Giese 1997). Riparian forests astride streams proposed for instream restoration are typically 80 years or older, and provide typical NFR habitat.

In the South River Resource Area, there are six critical habitat units (CHU), designated by the U.S. Fish and Wildlife Service for the recovery of the spotted owl, that overlap the watersheds. The function of these CHUs would not be modified as a result of the riparian restoration, culvert or road projects proposed. Relative to these projects, impacts to the spotted owl CHUs will not be analyzed further.

The 30-60 year old forest stands in Riparian Reserves in the Matrix and riparian areas in LSRs proposed for non-commercial vegetative treatments do not provide NFR habitat, though they do provide varying levels of dispersal habitat. Dispersal habitat is comprised of forest stands 40-60 years old that are used by owls for cover, roosting, and foraging while moving between areas of NFR (Thomas et al. 1990; USDI 1992; USDI 1994).

Road and culvert project areas would not substantively remove or modify NFR and dispersal habitat, though such habitat may be present adjoining a project location.

Marbled Murrelet

Only those watersheds or portions of watersheds that overlap designated marbled murrelet habitat zones would be of concern. These zones are identified as areas 0-35 miles inland from the Oregon Coast (Zone I) and 35-50 miles inland (Zone II). From 2002 to 2003, marbled murrelet occupancy has been documented in three locations in the South River Resource Area.

Forests used for nesting by murrelets are similar to forests used by the northern spotted owl, consisting of mature to old-growth trees with large limbs, deformities, mistletoe brooms and abandoned animal nests that provide nesting platforms. (Mack et al. 2002) Riparian forests astride streams proposed for instream restoration are typically 80 years or older. Those located within the murrelet management zones would provide suitable nesting habitat.

One marbled murrelet CHU overlaps portions of the Middle Fork Coquille and Olalla Creek-Lookingglass Creek watersheds. The function of this CHU would not be modified as a result of the riparian restoration, culvert or road projects proposed. Relative to these projects, impacts to the CHU will not be analyzed any further.

The Riparian Reserves or riparian areas in Late Successional Reserves (LSR) where riparian projects are proposed are not considered suitable nesting habitat for the marbled murrelet. Although occasional scattered remnant trees greater than 80 years old may be present, the primary stands are 30-60 years old and too young to have developed crucial nesting components (large limbs, deformities, and mistletoe).

Road and culvert project areas would not substantively remove or modify suitable nesting habitat, it may be present adjoining a project location.

Bald Eagle

The size of trees utilized by bald eagles for nesting varies according to region and forest type. In western Oregon nest trees are on average 191 feet tall and 70 inches in diameter (Anthony et al. 1982), with large limbs and deformities that may be used as a base for nest construction or roosting. The distance from nest trees to large water bodies is also highly variable, ranging from approximately ¼-mile in the Cascade Mountains to ¾-mile in the Columbia basin, Klamath basin and coastal regions (Anthony and Isaacs 1981).

Bald eagles are known to nest within the area of the Roseburg District, with nesting sites primarily documented northwest of Roseburg along the mainstem of the Umpqua River (Witt 1985). The only confirmed bald eagle nest and territory near the South Umpqua River is on private lands near Roseburg. Anecdotal information suggests that there may be another nest location, but it is also on private land.

Bald eagles have been observed roosting and hunting along Cow Creek, Middle Creek and the South Umpqua River, during the winter months. Yearly inventories in Douglas County between 1971 and 2003 have not identified any nesting territories on the South Umpqua River and Cow Creek, the two major water systems in the South River Resource Area (Isaacs and Anthony 2003). Riparian forests astride streams proposed for instream restoration are typically 80 years or older. Mature and old-growth forests within a mile of these waterways would provide roosting habitat and suitable habitat for nesting.

The 30-60 year old forest stands in Riparian Reserves in the Matrix and riparian areas in LSRs proposed for non-commercial vegetative treatments would not provide roosting and nesting habitat because they do not contain trees large enough to support nests.

Road and culvert project areas would not substantively remove or modify suitable nesting habitat, it may be present adjoining a project location.

2. Bureau Sensitive and Bureau Assessment Species

Appendix D contains an assessment of the availability of suitable habitat in the proposed and project areas for Bureau Sensitive and Bureau Assessment species known to be present on the Roseburg District. Only those species considered to have the potential of occupying restoration project areas will be addressed in Chapter 4.

B. Cavity Nesting Birds

Young riparian forest stands, in which non-commercial restoration projects are proposed, provide habitat for a variety of terrestrial species, including many woodpecker species. Woodpeckers are primary excavators, using their beaks to dig into dead or dying trees in search of grubs and larvae for food, or to excavate a cavity in which to nest during breeding season. Other bird species, among them the black-capped chickadee and red-breasted nuthatch, frequently use cavity abandoned by woodpeckers for their own nests.

Mature and old-growth forests astride areas proposed for instream restorations provide habitat for a similar group of birds that includes the largest woodpecker in the Pacific Northwest, the pileated woodpecker (*Dryocopus pileatus*). The pileated woodpecker is a major excavator of large diameter dead or dying trees, greater than 26 inches dbh, where it forages for ants and beetle larvae (Aubry and Raley 2002). The nesting cavities created may be used for several successive years, but pileated woodpeckers often excavate new cavities or cavity starts each year before selecting a final nesting site in the spring. The abandoned nest cavities, foraging excavations and cavity starts then become available as nesting cavities for small owls, kestrels, bats, squirrels, and other secondary cavity users (Aubry and Raley 2002).

Road and culvert projects would not usually be in areas with these habitat components. The amount of snags or cavity bearing trees in these project areas is unknown. The probability does exist that trees with old or new cavities created by woodpeckers would be present in these project areas.

V. Botany

Areas in which riparian restoration, stream restoration, road and culvert projects could be located represent a broad spectrum of habitats suitable for Special Status Species. Based upon these habitat types, the following species might be expected to occupy various project areas.

A. ESA Species

Kincaid's lupine (*Lupinus sulphureus* var. *kincaidii*) is a Federally-threatened species with a range that includes the South River Resource Area of the Roseburg District. It occupies a variety of habitats ranging from almost full exposure to forested ridgelines with closed canopy, and has been observed growing in road cuts and abandoned jeep trails.

B. Bureau Sensitive and Bureau Assessment Species

Wayside aster (*Eucephalus vialis* or *Aster vialis*), a Bureau Sensitive species, occupies mixed conifer and hardwood forest with open canopy, or forest margins in partial sun.

Tall bugbane (*Cimicifuga elata*), a Bureau Sensitive species, is most often found in or along margins of mature and older stands of low to mid-elevation forest, but has also been observed in clearcuts and on road cutbanks.

Clustered lady's slipper (*Cypripedium fasciulatum*), a Bureau Assessment species, is found in mixed conifer and hardwood with 60-100 percent canopy cover.

VI. Soils

The areal extent of the South River Resource Area includes the Oregon Western Cascades, Oregon Coast Range and Oregon Klamath Mountains. Soil types and properties across the area display an extremely wide range of physical and chemical characteristics. There are five soil-related properties of special concern with regards to the planning and potential implementation of the proposed restoration activities. These are: granitic, conglomerate and serpentine parent materials; somewhat poorly to very poorly drained soils; and floodplain soils.

Soils of a granitic origin are very susceptible to surface erosion when disturbed, and are prone to slope failures. The slope stability of soils formed from or atop conglomerate parent material is difficult to predict. Soils formed from serpentine material have a nutrient imbalance. They also may be unstable and have higher than normal ground water flows.

Somewhat poorly to very poorly drained soils will have a seasonal high water that may reach the soil surface. This elevated water table limits heavy equipment use to the driest time of the year to avoid compaction and puddling which are difficult to ameliorate. Flood plain soils are extremely variable in texture and drainage.

Table 3 summarizes by ownership and category, the approximate acreage of soils of concern in the South River Resource Area.

Table 3 – Soils of Concern

OWNERSHIP ACRES	GRANITIC	CONGLOMERATE	SERPENTINE	WET	FLOODPLAIN
BLM	26085	6427	4507	20216	88
PRIVATE	42686	9636	10562	55475	18342
TOTAL	68771	16063	15069	75691	18430

Soil data is available from the National Cooperative Soil Survey of Douglas County. This survey (unpublished) was conducted by the Natural Resources Conservation Service (NRCS), United States Department of Agriculture. Detailed soil series descriptions, soil mapping unit descriptions and soil interpretation sheets are available at the BLM and NRCS offices in Roseburg, Oregon. Soil survey data is also available electronically at the NRCS web site: www.or.nrcs.usda.gov/soils.html. This soil survey data would be augmented by on-site soils investigation on an as needed basis.

VII. Cultural/Historic Resources

A review of cataloged cultural sites and pedestrian surveys did not identify any cultural or historical resources at any of the presently proposed culvert replacement sites. A review of catalogued sites will be conducted for the remaining restoration projects to determine if any of the proposed actions occur at known cultural sites. Pedestrian surveys of areas proposed for other types of restoration projects would be conducted on a site-by-site basis.

All ground-disturbing activities would be conducted in a manner that complies with the National Cultural Programmatic Agreement and the Oregon BLM /Oregon State Historic Preservation Office (SHPO) Protocol. Stipulations would be placed project contracts to halt operations in the event of inadvertent discoveries of cultural resources (e.g. historic or prehistoric ruins, graves, fossils or artifacts). If cultural resources are found in a specific project area, the project would be redesigned to avoid the cultural resources or evaluated to determine significance. Subsequent evaluation and documentation would sent be to SHPO for concurrence.

VIII. Non-Native Species and Noxious Weeds

Implementation of the *Roseburg District Integrated Weed Control Plan and Environmental Assessment* (USDI, BLM 1995b) is an ongoing effort to prevent or reduce spread of weed populations, and control or contain existing infestations. This includes inventorying weed infestations, assessing the risk for spread, and control of weed species in areas in which management activities are planned. Control efforts may include release of biological controls, mowing, hand-pulling, and application of approved herbicides.

An inventory of noxious weed species is ongoing on the Roseburg District, with 22 species documented on BLM-managed lands in the South River Resource Area. Approximately forty other species suspected based on their presence on adjacent lands. Biological control agents have been applied for 13 of the 22 species and active control is being conducted on 15 of them. Himalayan blackberry is very common in riparian areas and can retard or prevent the natural establishment of native vegetation that can stabilize soil and control erosion (Menashe 2001).

District Management Priorities in Table 4 were derived from the guidelines contained in the BLM Roseburg District Weed Policy (2004). These priorities are consistent with those guidelines are further prioritized using the following criteria:

- Local abundance
- Threat to natural resources and adjacent agricultural lands
- Availability and effectiveness of biological controls
- Behavior of the species in Southwest Oregon.

Management practices to reduce the potential establishment or spread of weeds would include steam cleaning or pressure washing heavy equipment prior to move-in; seeding and mulching disturbed areas; or replanting native species in disturbed areas where natural regeneration is not likely to prevent weed establishment.

Additional measures could include treatment of noxious weeds prior to project implementation under the provisions of the *Integrated Weed Control Plan*, and scheduling projects so that work is conducted in uninfested areas prior to initiating work in infested areas. As a consequence, negligible changes in noxious weed populations are anticipated regardless of the alternative selected, and no further discussion of noxious weeds is necessary in this analysis.

Table 4 - Noxious Weeds in the South River Resource Area

Plant Common Name	Plant Scientific Name	Active Treat	Bio-control	Priority
Italian thistle	*Carduus pycnocephalus*	√	√	LOW
Wooly distaff thistle	*Carthamus lanatus*	√		VERY HIGH
Meadow knapweed	*Centaurea debeauxii*		√	MOD
Spotted knapweed	*Centaurea maculosa*	√		VERY HIGH
Malta starthistle	*Centaurea melitensis*	√		LOW
Yellow starthistle	*Centaurea solstitialis*	√	√	HIGH
Rush skeletonweed	*Chondrilla juncea*	√	√	HIGH
Canada thistle	*Cirsium arvense*	√	√	LOW
Bull thistle	*Cirsium vulgare*	√	√	LOW
Poison Hemlock	*Conium maculatum*		√	LOW
Scotch broom	*Cytisus scoparius*	√	√	MED
Giant horsetail	*Equisetum telmateia*			LOW
French broom	*Genista monspessulana*	√		HIGH
St. Johnswort	*Hypericum perforatum*		√	LOW
Purple loosestrife	*Lythrum salicaria*	√	√	MED
Japanese Knotweed	*Polygonum cuspidatum*	√		HIGH
Sulfur cinquefoil	*Potentilla recta*	√		HIGH
Himalayan blackberry	*Rubus discolor*	√		LOW
Tansy ragwort	*Senecio jacobaea*		√	LOW
Milk thistle	*Silybum marianum*		√	MOD
Medusahead rye	*Taeniatherum caput-medusae*			LOW
Gorse	*Ulex europaeus*	√	√	HIGH
22	**Total Species**	**15**	**13**	

Chapter 4
Environmental Consequences

This chapter discusses how the specific resources identified in the previous chapter would or would not be affected in the short term and long term, by implementation of the alternatives contained in this analysis. The discussion also identifies potential impacts or consequences that would be expected.

I. Alternative One – No Action

Future projects would be limited to those necessary to protect infrastructure, correct the most severe water quality and erosion problems, and provide for public safety. This would not meet the need expressed by management direction to restore the condition of riparian vegetation, control and prevent road related runoff and sediment production, and restore instream habitat complexity. Nor would this alternative meet the requirement of Title II of the "Secure Rural Schools and Community Self-Determination Act of 2000" to approve the use of funds made available under the Act for the protection, restoration, and enhancement of fish and wildlife habitat.

A. Vegetation

Predominantly single-storied stands would not likely develop into structurally diverse stands without some alteration of the present growth and developmental trajectories, through thinning (Tappeiner et al. 1997).

In the absence of any thinning or girdling treatments, relative stand densities would continue to increase. Shade intolerant species would likely die out and shade tolerant species would remain suppressed in the under story. Available sunlight would not be sufficient to allow conifer and hardwood regeneration necessary to initiate multi-story stand conditions (Oliver and Larson 1990). This would lead to simplification of vegetative communities, inconsistent with the Aquatic Conservation Strategy objective of developing plant communities in riparian zones that are diverse in structure and species composition.

Over time, the crowns of individual trees would recede, resulting in increased rates of suppression mortality among some trees and reduced vigor among surviving trees. The height to diameter ratio of surviving trees would increase, predisposing them to potential stem buckling, or tipping (Oliver and Larson 1990).

Trees would become less capable of adapting to, or surviving disturbances, and more likely to succumb to attack by insects or disease. The ability of individual trees to release in response to any future thinning treatments would also decrease.

B. Fish and Aquatic Habitat

1. Aquatic Habitat Conditions

There would be no direct effects to aquatic habitat.

Habitat conditions would continue to be indirectly and cumulatively affected, however, by harvest of riparian forest on private lands, and by sediment-laden run-off from forest roads and agricultural lands.

Amounts of large woody debris would gradually decline from the present levels as logs rot, break apart and are passed down stream. Future recruitment of large wood from riparian areas on Federally-managed lands would be delayed by decades as a consequence of failing to manage stand density in young riparian forests at a level that would accelerate the growth of large trees. As the quantity of large wood diminishes, the quantity and quality of pool habitat would also diminish resulting in a reduction in cover and rearing habitat.

Sediment would continue to degrade spawning substrates as runoff from roads on both Federal and private lands contribute abnormal levels of sediment. The quality and quantity of spawning habitat would decline as substrates become embedded with excess fine sediments or are flushed downstream instead of being retained by large woody debris.

Access would not be reestablished to habitat blocked by stream-crossing culverts, and these historical spawning and rearing areas would remain inaccessible.

2. Special Status Species

There would be no direct effects to fish species, but indirect effects from existing conditions of sedimentation would persist. Embedded sediments have been linked to low survival rates for fish embryos, and increased turbidity has been associated with disturbance of normal feeding and territorial behavior in juvenile fish. Embedded sediments and increased turbidity have also been shown to reduce growth and displace juvenile coho from occupied habitat (Bjornn and Reiser 1991).

3. Essential Fish Habitat

Essential Fish Habitat would not be directly affected, but indirect effects associated with abnormal sedimentation from forest roads would result in increasing embeddedness of spawning substrates with a corresponding decline in the availability of quality habitat for chinook and coho salmon.

Culverts that are barriers to fish passage would continue to block access to habitat historically utilized by chinook and coho salmon.

C. Water Quality

There would be no direct effects on water quality. Passive improvements in current conditions may occur over time. Long-term, indirect effects would be expected to contribute to further degradation of water quality, however.

Absent sufficient large woody debris to reduce stream velocities and create pool habitat, streams would tend to become channelized rather than meandering. Substrates would be scoured out and stream banks undercut. As channels continue to downcut, streams would become disconnected from adjacent flood plains.

Sediments from failing road cuts and fills, erosion of unsurfaced roads, and inadequate road drainage would increase turbidity and further degrade water quality, potentially leading to an eventual need to list streams as water quality limited.

Down cutting from improperly installed, undersized and/or failing culverts would continue to degrade stream structure by undercutting stream banks and increasing sediment input. This would lead to widened channels, decreased channel depth and a greater potential for increased solar heating and elevated water temperatures.

D. Wildlife

1. ESA Species

There would be no direct effects on the Federally-threatened northern spotted owl, marbled murrelet, or bald eagle for the foreseeable future because habitat for nesting, roosting, foraging, cover and dispersal would not be removed or modified.

2. Bureau Sensitive and Bureau Assessment Species

There would be no anticipated effects to these species as current habitat would not be removed or modified.

3. Cavity Nesting Birds

Many species of birds, including primary cavity excavators such as woodpeckers and other birds that are secondary cavity users depend on the young, 30-60 year old forest stands for nesting, foraging, and resting areas in the spring and summer.

A failure to manage density in these young stands would retard development of quality habitat. The growth and development of trees large enough to provide habitat for primary cavity nesters would be delayed by 20 years or more. Suppression mortality would lead to eventual elimination of hardwoods as stand components and retard the growth of larger trees that would provide larger snags in the future. Suppression mortality, bug kill, and weather damage such as snow break would create snags, but these would be too small in diameter to provide suitable habitat for some primary cavity makers, which would reduce the amount of habitat available to secondary cavity users.

E. Botany

Kincaid's lupine and those Bureau Sensitive and Bureau Assessment species identified in Chapter 3 (pp. 18-19) would not be directly affected because there would be no management actions which would alter current habitat conditions.

F. Soils

There would be no soil disturbance, soil compaction and potential erosion associated with the operation of heavy construction equipment. Current erosion of unstable road fills would remain uncorrected, leading to potential slope instability and future failures.

II. Alternative Two - Proposed Action

Restoration opportunities identified would be undertaken, and similar projects identifed in the future would be implemented if the consequnces were consistent with those analyzed here. This would meet the need expressed by management direction to restore the condition of riparian vegetation, control and prevent road related runoff and sediment production, and restore instream habitat complexity. It would also meet the requirement of Title II of the "Secure Rural Schools and Community Self-Determination Act of 2000" to approve the use of funds made available under the Act for the protection, restoration, and enhancement of fish and wildlife habitat.

A. Vegetation

Thinning to a variable spacing would reduce existing stand densities and promote understory development and vertical diversity. It would also increase the growth rates in overstory trees (Hayes et al. 1997), providing larger trees in those areas most likely to contribute large wood to stream channels in the future.

Release would improve individual tree vigor and accelerate development of multi-story structure by stimulating new tree regeneration to supply future intermediate and overstory individuals (Oliver and Larson 1990). Lowered levels of canopy closure and more irregular spacing would allow sufficient sunlight to reach the forest floor to stimulate the germination and growth of understory vegetation (Bailey et al. 1998). Structural differences e.g., more developed multi-storied canopies would influence not only current function, but also future stand development, species composition and structural and functional attributes (Bailey 1996, Bailey and Tappeiner 1998).

Tree height to diameter ratios would stabilize as diameter growth rates increase and height growth rates remain unchanged, reducing the potential for stem buckling, or tipping. Standing girdled trees would also provide short-term stand stability support.

Girdled overstory trees may take one or more years to die, and then remain standing for several years after that, maintaining a higher degree of effective shade than if the trees were felled. In general, trees felled in the smallest diameter classes from within the understory would not appreciably affect canopy closure or shade levels.

B. Fish and Aquatic Habitat

1. Aquatic Habitat Conditions

Riparian Restoration

There would be few effects to aquatic habitat associated with non-commercial riparian vegetation treatments. As these activities would not include the use of heavy equipment or construction of any access roads, the potential for soil disturbance and sedimentation would not exist. Trees immediately adjacent to stream banks would be retained so that their roots would maintain bank stability and provide shade directly adjacent to and above the stream(s). Felled or girdled trees that make their way into streams would not be large enough to create additional pool habitat, but they would contribute organic nutrients usable by invertebrates on which fish prey. The reduction of stand densities would also aid in establishment of a developmental trajectory that would greatly accelerate the growth of large trees for future recruitment as large woody debris.

Instream Restoration

No effect on stream temperatures would be anticipated. Fewer than 80 trees per mile of stream or one tree per acre, on average, would be removed from within the adjacent riparian corridors. These would be selected from the more sheltered aspects, where practicable, would be located at a distance of greater than 25 feet from stream banks, and would be chosen to avoid the creation of large canopy openings. Consequently, there would be no appreciable change in streamside shading or stream temperature.

Some potential for sediment would exist. This would be associated with: stream bank disturbance during felling and/or winching of logs and trees into position; using an excavator to position logs and key them into stream banks; and operating an excavator in the stream channel. In the case of keying or embedding logs into the bank, approximately one cubic yard of soil per log could be displaced into the channel. In order to minimize the potential effects of these activities, the following project design features and Best Management Practices could be employed:

- Using trees from on site and placing logs that are 1.5 to 2.0 times the channel width would minimize the need for excavation.

- Silt dams or fences would be installed below excavation sites to limit the extent to which fine sediment may be transported downstream, lessening the area affected.

- Instream work would be scheduled between July 1st and September 15th when flows are at summer lows.

- Absorbent booms would be installed below the project site which would trap sediments and any accidental spills of petroleum products.

- Disturbed areas would be mulched and seeded with native grass seed.

With these mitigations, the amount of sediment delivered to streams would be small. The effects would be short-term as any fine sediment deposited in stream channels would be mobilized during the first winter freshet, and would not become embedded in spawning gravels. Any small amounts that remain would be insufficient to affect spawning habitat or the survival of eggs and emerging fry in the following winter.

Road and Culvert Projects

The direct effects of these activities would be primarily the same as those from instream restoration. Habitat up to one mile downstream from culverts could receive additional fine sediment that could impair spawning habitat by embedding gravels, but scour associated with the first winter freshet would likely wash sediment free from the gravel. In addition to those described above, additional project design features and Best Management Practices that could be employed to reduce these effects would include:

- Stream flow would be diverted or bypassed around culvert sites.

- Silt fences would be installed and construction areas dewatered.

2. Special Status Species

Riparian Restoration

No direct effects to anadromous and resident salmonids would be expected, because there would be no sediments generated, and shade would be maintained at levels sufficient to prevent any increases in water temperature. In the long-term, density management would provide larger trees in a shorter period of time. These trees would then potentially provide additional large wood to streams, increasing the quantity and complexity of pool habitat, which would provide more abundant spawning, rearing and sheltering habitat in support of larger fish populations. The addition of organic matter would also enhance macro-invertebrate abundance, providing additional forage for juvenile fish.

Instream Restoration

Short-term effects would be associated with temporary increases in sediment in the project locality. These would be mitigated as described above. Long-term benefits would include the capture and retention of substrates to provide additional spawning opportunities for adult fish; creation of structurally complex habitats; and the creation of deep pools and off-channel habitat to provide cover and rearing habitat for juvenile fish. The overall objectives would be to provide greater spawning success, higher juvenile survival rates, and better juvenile health condition when compared to the current conditions. The benefits of these projects would be realized almost immediately following completion and persist for up to 50 years depending on the durability of structures.

Limiting projects to the instream work period from July 1 to September 15 would minimize direct effects to fish because they would occur outside of the times of adult spawning and alevin emergence.

Road and Culvert Projects

The potential effects of road improvement and decommissioning projects would only be of concern where roads are located less than 200 feet from streams. The short-term effects would arise from mobilization of sediments, which would be mitigated as previously described. Long-term benefits would accrue from reductions in suspended sediments that might otherwise interfere with respiratory function and foraging, as well as embedded sediments that would otherwise reduce embryo emergence and survival.

Replacement of stream-crossing culverts that are barriers to fish passage would have similar effects on sediment, which would be mitigated as described above. The construction of bypass roads may involve removal of some trees that provide stream shading, but the small size of the project area (less than one acre) would preclude any measurable changes to stream temperatures. In areas where streams currently lack shade or future availability would be in doubt, bio-engineering treatments would be developed to provide future shading and bank stabilization.

Replacing fish barrier culverts would restore access for resident and anadromous fish to miles of historically accessible habitat. Adult salmon would be able access spawning habitat, and juvenile fish would be able to migrate on a seasonal basis to optimal summer rearing and winter refuge habitat.

3. Essential Fish Habitat

Riparian Restoration

There would be no short term affects to Essential Fish Habitat because there would be no effect on sediment and stream temperatures.

Over the long term, accelerated growth of large trees would shorten the time before additional wood is recruited into streams, providing additional pool habitat, aggrading substrates, and providing more abundant spawning habitat. Increased number of pools would also provide additional rearing habitat for juvenile fish.

Instream Restoration

Disturbance associated with felling trees, or placement of logs/structures could result in the deposition of some sediment into stream channels which would settle out in the spawning substrates. This effect would be short term however, as scour from the first winter freshet would remove any fine sediment deposited in riffles.

Road and Culvert Projects

In the short term, road improvement projects would not be expected to contribute any measurable amount of additional sediments to streams. Ground disturbing activities associated with surfacing or resurfacing roads, maintaining existing drainage structures, installing additional drainage, and stabilizing fills and cuts would be conducted in the dry season. If work occurred in close proximity to live streams, silt dams would be installed to prevent inadvertent sedimentation. Areas of disturbed and exposed soil would be mulched and revegetated.

Over the longer term, improvements to road surfacing and drainage would reduce overall amounts of road-derived sediment. Installing additional drainage and maintaining well vegetated ditch lines would prevent road runoff from delivering sediment to stream channels, by intercepting ditch runoff and directing it to the forest floor where sediment would settle out.

C. Water Quality

Non-commercial vegetative treatments in riparian areas would not result in sedimentation because there would be no activities that displace soil. Retention of trees adjacent to streams would provide root strength for maintenance of stream bank integrity and maintain direct shading so that water temperatures would remain unaffected.

Instream restoration projects would potentially generate small amounts of sediment, but these would be localized in nature and short term in duration. In the long-term, tree-lining and placement of instream structures would enhance stream function, and aid in restoring connection of the streams to groundwater and floodplains that would provide additional flow volume during low summer base flows.

The increased amounts of large woody debris would also reduce flow velocity, reduce stream bank and bed shear stress and associated erosion, increase pool frequency, promote channel stability and bank building processes. This would help restore channel width/depth conditions and narrow stream channels, affecting decreases in stream temperatures.

Road improvements in upland areas would not have any direct effect on water quality, although more effective dispersal of road and ditch line runoff would indirectly affect water quality by reducing the potential of diverting sediment into stream crossings.

Road improvements in riparian areas could result in sediment production where vegetation is removed and soil disturbed by excavation. These effects would be short-term and localized in scope, and minimized through the application of project design features and Best Management Practices previously described. In the long-term, surfacing roads would reduce surface erosion. Improvements to road drainage would disperse runoff more evenly across the landscape. Sediment would settle out on slopes rather than being transported directly into streams.

For road decommissioning, the removal of cross-drain and stream-crossing culverts would disconnect roads from the drainage network, thus preventing the transport of sediment into live water. Stabilization of fill slopes would reduce the potential for slope failures that could reach streams. Revegetation of disturbed areas would reduce or eliminate the potential for future erosion and sediment.

Replacement of existing stream-crossing culverts with arched-pipes or pre-cast vaults set at or below stream bed elevation would eliminate down cutting. Sizing to full bank width would remove flow constrictions, reduce stream velocities and rates of bank and channel erosion. Designing crossings to accommodate a 100-year flood event would lessen the risk of failure and washout that could introduce large quantities of sediment into streams.

D. Wildlife

The discussion of potential effects to species is limited to those project categories for which the presence of suitable habitat is noted in Appendix D, unless otherwise indicated.

1. ESA Species

<u>Northern Spotted Owl</u>

Instream Restoration

For the instream restoration and tree-lining currently envisioned, an estimated 900 to 1,200 trees in the range of 18-30 inches dbh would be removed from mature and late-successional forest stands throughout the South River Resource Area. Based upon Riparian Reserve widths for fish-bearing streams that vary from 320 to 360 feet, this would represent an average of slightly less than one tree per acre, though multiple trees could be removed in close proximity to one another.

Felling or pulling of individual trees would modify suitable habitat. Irregular openings in the forest canopy, 20 to 40 feet across, would be created by the removal of individual trees and collateral damage to the crowns of adjacent trees. This could result in a reduction in cover, shade, and roosting structure that is important for thermo-regulation by young and adult owls during periods of hot weather. With application of the following criteria the selection of trees would minimize habitat modification such that the forest would continue to function as nesting habitat at the project and stand levels.

- Trees would be selected that do not afford obvious protection for suitable nest trees. Efforts would be made to minimize the size of canopy gaps created.

- To the extent practicable, trees would be selected from the intermediate canopy.

- Trees with characteristics that would provide potential nesting opportunities would not be selected. These would include: trees with large amounts of rot; snags with cavities; trees with broken tops; large wolfy trees with bole cavities; trees providing overhead canopy; and trees with stove-pipe shapes.

Disturbance to nesting owls within ¼-mile of a project area is a concern between the dates of March 1 and June 30. As instream project work would be limited to the period between July 1 and September 15, this would not be a concern.

Modification of habitat within ¼-mile of an activity center during the post-fledging season would remain a concern, however. If surveys document successful nesting, the project(s) would be modified to exclude the area or work would be deferred to a subsequent year when surveys indicate that the activity center is unoccupied, the owl pair was not nesting, or nesting attempts were unsuccessful.

An estimated 25 to 30 percent of the instream restoration would occur in designated CHUs. The impact to CHUs would be associated with the removal of 250 to 300 to trees, and potential damage to adjacent trees and other habitat components resulting from tree felling. As noted in Appendix C, there are 26,201 acres of suitable habitat within the six CHUs in the South River Resource Area. The low levels of tree removal would have a negligible effect on dispersal function of the CHUs and would not change current distribution of spotted owls.

Road and Culvert Projects

The limited scope of this work within the road right-of-ways and at stream crossings would have minimal effects on spotted owls. In general, potential removal or modification of suitable habitat would be limited to that associated with the construction of bypass roads that may remove individual trees capable of providing habitat. This would be mitigated to the greatest extent practicable by avoiding trees possessing the characteristics described above. If the project area is situated within ¼-mile of an owl activity center, the seasonal restrictions for disturbance and habitat modification, described above, would apply.

<u>Marbled Murrelet</u>

Potential effects to murrelets and their habitat would be limited to areas within the conservation and habitat management zones, illustrated on the project maps in Appendix A. As noted in Appendix C, there is one designated marbled murrelet in the South River Resource Area. Where projects would occur within ¼-mile of unsurveyed suitable habitat, daily operational restrictions (DOR) would be implemented to mitigate the potential for disturbance. These consist of a prohibition on the operation of power equipment until two hours after sunrise and a cessation of operations two hours before sunset, from April 1st to August 5th.

For projects that would modify or remove suitable habitat, two years of protocol surveys (Mack et al. 2003) would be completed to document the presence or absence of occupation. If completion of the two-year protocol is not feasible, the U.S. Fish and Wildlife Service would be contacted on a case-by-case basis to discuss other means of insuring that nesting birds would not be affected.

Riparian Restoration

While these projects would not affect suitable murrelet habitat, they would have the potential for disturbance to nesting birds. To mitigate disturbance to nesting birds that may be present in nearby areas, the DORs described above would be employed.

Instream Restoration

The felling or pulling of individual trees would modify suitable murrelet habitat. Irregular openings in the forest canopy, 20 to 40 feet across, would be created by the removal of the individual trees and collateral damage to the crowns of adjacent trees. Impacts from felling trees would include: creating irregular openings estimated to be 20 to 40 feet across; enlarging existing openings; breaking out branches on adjoining trees that might provide suitable nesting platforms; and removing trees with suitable nesting structure.

Increasing the numbers or sizes of canopy gaps and openings may reduce cover for nesting birds and predation of nests by crows, ravens and jays. The exact level at which predation may increase is not known. Predation levels are related to stand structure, are scale-sensitive, and are likely more important at landscape scales of 5-50 km^2 (1.9-19 sq miles) while predicting predation rates at small scales of 0.5-1.0 km^2 (0.2-0.4 sq miles) is not possible (Luginbuhl et al. 2001).

Road and Culvert Projects

The limited scope of this work within the road right-of-ways and at stream crossings would have minimal effects on murrelet habitat. In general, potential removal or modification of suitable habitat would be limited to that associated with the construction of bypass roads that may remove individual trees that may provide nesting opportunities. This would be mitigated to the greatest extent practicable by avoiding trees possessing the characteristics described above. If the project area is situated within ¼-mile of unsurveyed suitable habitat, DORs described above would be implemented to mitigate the potential for disturbance to nesting murrelets.

<u>Bald Eagle</u>

Instream Restoration

Removal of conifer trees more than a mile distance from major water systems would not affect roosting and nesting habitat for bald eagles. A small number of bald eagles, between one and five, are known to hunt in the Cow Creek watershed during the winter, spring and summer months. None of the projects presently proposed are within a mile of Cow Creek or the South Umpqua River, though some are in proximity to Middle Creek which is a major tributary to Cow Creek.

In the Lower Cow Creek watershed, the process of selecting trees for instream use would avoid dominant old-growth trees to eliminate the possibility of removing potential nest trees. Trees in which nests have been constructed by other large raptors would also be avoided. While projects in the Lower Cow Creek watershed could remove potential roosting trees, overall forest stand conditions would remain largely unchanged and the forest stand would continue to provide nesting, and roosting habitat for the bald eagle.

Road and Culvert Projects

The limited scope of this work within the road right-of-ways and at stream crossings would have minimal effects on eagle habitat. In general, potential removal or modification of nesting and roosting habitat would be limited to that associated with the construction of bypass roads. This would be mitigated to the greatest extent practicable by avoiding locations with trees suitable for nesting and roosting.

2. Bureau Sensitive and Bureau Assessment Species

Northern Goshawk

Instream Restoration

The removal of individual trees would modify suitable nesting habitat, as would the expected loss of branches in adjoining trees. This modification would be spread over large areas however, so that the habitat would remain functional and future use of the stands by goshawks would be unchanged.

To further reduce the potential level of habitat modification, trees containing nests constructed by goshawks or other large raptors would be avoided in the process of selecting trees.

Occupancy in the stands by goshawks is unknown. Project areas would be evaluated for habitat suitability and potential occupancy consistent with direction provided by BLM-IM- OR-98-012 (USDI, BLM 1998b). If deemed necessary, surveys would be conducted according to standard protocols. Where goshawks are determined to be present, a thirty acre buffer of undisturbed habitat would be established around the nesting site and any alter4native nest sites. To avoid disturbance of nesting birds, activity would be restricted within ¼-mile of the nest site between March and August or until young have dispersed.

Road and Culvert Projects

While these projects would take place within existing rights-of-way, the construction of bypass roads for culvert replacements would potentially remove habitat. Application of the measures described above would minimize potential effects to goshawks and habitat.

Purple Martin

Instream Restoration

Because purple martins are secondary cavity nesters, frequently occupying cavities created by woodpeckers (reviewed by Copley and Finlay 1999), the potential exists for loss of nest trees from tree felling. Avoiding snags, trees with cavities, and those with large amounts of rot in the process of selecting trees would minimize loss. In conjunction with the low degree of stand modification at the project level, potential loss of nesting habitat would be low and not likely to affect local population levels.

Road and Culvert Projects

While these projects would take place within existing rights-of-way, the construction of bypass roads for culvert replacements would potentially remove nesting habitat. Application of the measures described above would minimize potential loss of nesting habitat.

<u>Northwestern Pond Turtle</u>

Instream Restoration

Nesting habitat is most frequently found in open grassy areas on in south facing slopes (Holland 1994). Data on species distribution at higher elevations is unavailable, but current information identifies populations near larger streams in lower elevation valleys. Effects would most likely be associated with disturbance of nesting habitat from the construction of access trails and winching of trees across the ground. To minimize these potential effects, areas with suitable habitat such as described above, would be avoided wherever practicable.

<u>Oregon Shoulderband, Green Sideband, Crater Lake Tightcoil, and Chace Sideband Snails</u>

Instream Restoration

Effects would be primarily related to the disturbance of habitat associated with the construction of access trails, and winching and positioning of trees and logs near stream banks. The amount of available habitat is unknown and the level of disturbance at the project scale presently unquantifiable.

To limit disturbance, project areas would be evaluated for suitable habitat. Where habitat is present, surveys would be conducted if deemed necessary, or areas of suitable habitat would be avoided to the greatest degree practicable in order to minimize disturbance.

<u>Del Norte Salamander</u>

Instream Restoration

Rocky talus habitat is present throughout the resource area, frequently in the vicinity of streams. This salamander is large and uses cavities created by the accumulation of these materials. Effects would be related to habitat disturbance, particularly compaction from the construction of access trails, and winching and positioning of trees and logs near stream banks.

The following project design features would be used to mitigate or avoid direct effects:

- Project areas would be evaluated for the presence of suitable habitat.

- Access trails would be located so as to avoid talus habitat to the greatest degree practicable.

- If deemed necessary, surveys would be conducted to establish the presence or absence of salamanders.

Foothill Yellow-Legged Frog

Instream Restoration

The foothill yellow-legged frog typically inhabits perennial streams with rocky, gravelly or sandy bottoms (Nussbaum 1983), though it may also utilize residual pools in intermittent streams in late summer (reviewed by Applegarth 1994). Effects would be associated with the physical disturbance of individual frogs during tree placement, and effects from sediments generated during instream work. These would be mitigated by implementing instream projects after June 30th, documenting the presence of the frogs in order to avoid direct harm, and implementing project design criteria that would minimize the scope and duration of effects from sediment, such that effects would be short-term, as sediment would be flushed by the first winter freshet.

Over the long-term, foothill yellow-legged frogs would benefit from additional pool habitat created by the placement of large wood for instream structure.

Road and Culvert Projects

Sediment generated during culvert replacement could affect habitat utilized by the foothill yellow-legged frog. Project design criteria applicable to instream work would minimize affects to sediment levels. Any remaining effects would be short-term, as sediments would be flushed by the first winter freshet. As a consequence, habitat conditions for the foothill yellow-legged frog would not be altered.

Road improvements, particularly those that are designed to reduce erosion and improve drainage would benefit the foothill yellow-legged frog by reducing the levels of sediment delivered to streams by the transportation system.

Tailed Frog

Riparian Restoration

This species inhabits cold, fast moving, higher gradient streams. Increases in stream temperature and elevations in sediment are thought to be the primary factors that would affect tailed frogs. (Applegarth 1994 and Marshall et al. 1996)

Non-commercial vegetative treatments in young riparian forest stands would not affect either of stream temperature or sediment. As a consequence, existing populations would not be affected.

Instream Restoration

These projects would generally be undertaken on lower gradient streams inhabited by anadromous and resident fish, generally not be inhabited by the tailed frog. In the event that the species is present, however, project design criteria implemented to prevent loss of stream shading would prevent elevation of stream temperatures. Seasonal restriction on operations during low summer flows in conjunction with project design criteria that would minimize sediment would limit the affected area and duration of effects. Small amounts of sediment generated would be flushed by the first winter freshet. As a consequence, habitat conditions for the tailed frog would not be altered.

Road and Culvert Projects

Sediment generated during culvert replacement could affect habitat utilized by the tailed frog. Project design criteria applicable to instream work would minimize affects to sediment levels. Any remaining affects would be short-term, and would be flushed by the first winter freshet. As a consequence, habitat conditions for the tailed frog would not be altered.

Road improvements, particularly those that are designed to reduce erosion and improve drainage would benefit the tailed frog by reducing the levels of sediment delivered to streams by the transportation system.

Fringed Myotis Bat

Instream Restoration

Effects to these bats would be associated with the loss of roosting habitat characterized by trees with loose bark, and dead or dying tops. This could result from the direct felling of selected trees or collateral damage to adjacent trees.

Criteria for the selection of trees to be felled would largely avoid trees that would provide roosting habitat, and minimize damage to other trees. In consideration of the low number of trees to be removed, and the corresponding low level of modification to existing stand conditions, it is unlikely that roosting habitat would be deficient or that population levels of bats would be affected.

3. Cavity Nesting Birds

Riparian Restoration

Treatment of young stands would immediately provide small snags that would supplement those created by snow break, suppression mortality and bug kill. These smaller snags, less than 8 inches dbh, would provide habitat for insects which would provide forage for many resident bird species. Girdling of larger trees would provide some habitat for smaller cavity nesters in the short term. Smaller woodpeckers like the downy woodpecker, and red-breasted sapsucker forage in smaller diameter stands creating cavities that may be used by species like the black capped chickadee and brown creeper.

Most primary cavity makers would not benefit in the short term. Larger woodpecker species like the pileated woodpecker, hairy woodpecker, and northern flicker forage in stands of larger trees and excavate cavities that would exceed the diameter of the girdled trees (6-8.4 inches) (reviewed in Aubry and Raley 2002).

Over the long term, the quantity and quality of habitat would improve as long-lived hardwoods are retained as stand components, and the growth of larger conifers accelerates the recruitment of large snags by 20 years or more. The increased numbers of larger trees would provide additional habitat for primary cavity nesters, with subsequent increases in habitat for secondary cavity users.

Instream Restoration

Impacts to cavity nesting birds would be minimal. The removal of individual trees might remove potential nest trees for the pileated woodpecker and other large woodpeckers. This would be mitigated by the tree selection process. The small number of trees removed over such large areas would not appreciably change the function or amount of available habitat, however.

Road and Culvert Projects

Implementation of road and culvert projects may require the removal of snags or dying trees in a variety of diameters, particularly in the case of construction of bypass roads for culvert replacements. The amount is unquantifiable, but avoidance of nest trees would be considered in the location of bypass roads. Seasonal operating restrictions for spotted owls, marbled murrelets and goshawks would afford protection to nesting birds.

E. Botany

There would be no direct effects to Kincaid's lupine. If discovered during pre-project surveys, areas containing the lupine would be excluded from treatments or other forms of disturbance to maintain the integrity of the population(s).

Because of the closed nature of dense, young riparian forest stands and a general lack of sunlight reaching the forest, it is not expected that the Bureau Sensitive and Bureau Assessment species identified in this analysis would be present. As a consequence, non-commercial riparian restoration projects would not affect them.

For tree-lining and instream restoration projects, the removal of one tree per acre, on average, from within the adjacent riparian corridors would not cause sufficient modification to canopy closure and microclimate to affect populations of these plants. Effects would arise from ground disturbance associated with excavator operations and log skidding.

Pre-project clearance would be conducted. Where the potential is considered high for the presence of populations of Bureau Sensitive and Assessment species, and substantial effects are considered possible, surveys may be conducted and sites excluded from ground-disturbance. Consequently, population levels of these plants would remain relatively unchanged, and the proposed restoration activities would not contribute to a future need for listing any of these species under the ESA.

F. Soils

No short-term effect to soil resources would be expected in association with non-commercial riparian restoration treatments. Thinning and girdling would be conducted using hand tools and/or chainsaws, with access provided by existing roads. As a consequence, there would be no soil disturbance and erosion, or puddling associated with heavy equipment operation. Over time, the organic material provided by decomposition of the cut and girdled trees would provide additional nutrients to the soils.

For stream restoration projects, consisting of placement of instream structures and tree-lining, three potential effects to soils exist: compaction and surface disturbance from temporary roads for streamside access for structure placement; soil disturbance and compaction from the operation of heavy equipment in and adjacent to streams; and surface disturbance from tree-lining associated with winching trees into place.

For road improvements and decommissioning, and the replacement of stream-crossing culverts, most work would be accomplished within existing road easements, which would minimize impacts. Beyond this, impacts would be substantially the same as those for instream restoration projects. Construction of bypass roads for culvert replacement projects would result in surface disturbance and compaction. Road decommissioning would result in soil displacement.

To minimize the overall impacts, Best Management Practices would be applied that would include:

- Operation of heavy equipment would be limited to the dry season when lower soil moistures would render soils less susceptible to compaction and puddling.

- Access roads for instream work would be pre-designated so that less than ten percent of a project area would be subject to equipment passage and potential compaction.

- Temporary access and bypass roads would be sub-soiled to ameliorate compaction and restore soil productivity, and blocked to vehicular traffic to prevent future surface disturbance and erosion.

- Disturbed areas would be seeded and mulched to reduce the potential for surface erosion.

As a result of implementation of these mitigations, impacts would be short-term, less than three years, and localized in nature. In addition, reductions in road surface erosion and stabilization of road fills and cuts in conjunction with road improvements would provide further protection of soils.

III. Cumulative Effects

Cumulative effects are the incremental effects of a proposed action when added to other past, present, and reasonably foreseeable actions, regardless of which agency or person undertakes them. This analysis discusses cumulative effects in the context of the proposed action with other known and likely actions in the resource area and for a time period of 5 to 10 years.

The South River Field Office has completed numerous restoration projects since the ROD/RMP was implemented in 1995. Restoration projects related to roads, have generally been completed in association with timber sales, though recent project, especially the replacement of stream-crossing culverts, have been conducted as independent projects. Past accomplishments include:

- Road improvement, storm proofing, and decommissioning
- Fish passage restoration at culverts and other structures that impede fish passage
- Treatments on hill slopes including landslide stabilization and gully erosion control
- Riparian treatments
- Treatments in streams, including the placement of large wood in the channel to restore aquatic habitat
- Noxious weed control and prevention
- Protection of special status species and habitat restoration
- Density management in Late-Successional Reserves to speed up the development of old-growth characteristics

There have been eight culverts replaced within the past year to provide fish passage on private lands in the resource area. Four culverts were replaced in 2003 by the South River Field Office to allow fish passage to 11 miles of streams. Thirty-one culverts are proposed for replacement by the BLM in the next 5 to 10 years. The 43 culverts replaced or proposed for replacement constitute about nine percent of the 486 culverts in the resource area considered to be fish passage barriers. Previous culvert replacements by the BLM and other parties and replacements anticipated in the foreseeable future would restore access to more than 48 miles of stream habitat out of about 777 miles of anadromous fish bearing streams in the South River Resource Area. Fish species would have an increased ability to withstand natural events (such as floods and drought, which can lead to population declines), by migrating to more desirable habitats.

Permanent road construction, limited road decommissioning, and substantial road renovation and improvements are anticipated to be implemented with timber sales. Sedimentation and landslides would decrease in the long-term compared to the past because of better road construction and maintenance practices.

Approximately six miles of road have been fully decommissioned in the resource area in the past six years. About 20 miles of road are proposed to be fully decommissioned in the next 5 to 10 years. This constitutes about two percent of the BLM controlled road mileage in the resource area and would reduce the road density on BLM-administered land from 4.2 miles per square mile to 4.1 miles per square mile. An undetermined amount of BLM and private new road construction in the South River Resource Area is anticipated to occur somewhat concurrent with this decommissioning.

About 37 miles out of 1,287 miles of BLM controlled roads have been improved in the resource area in the past six years. About 70 miles of road improvements are proposed. These 107 miles constitute about eight percent of the BLM controlled roads in the South River Resource Area. This represents approximately 36 percent of the 466 miles of BLM-controlled roads recommended for improvements in the Transportation Management Objectives (TMOs) contained in the watershed analyses.

Stream habitat restoration projects have been completed at seven sites within the past year on private lands in the South River Resource Area. Three stream habitat restoration projects on BLM-administered land were constructed in the past three years on about five miles of streams. Potential stream habitat restoration projects would be implemented at about 18 sites, creating about 13 miles of stream habitat by placing logs or boulders in streams, on BLM-administered land in the resource area in the next 5 to 10 years. Research and monitoring have shown stream habitat restoration projects improve habitat by decreasing width to depth ratios, retaining gravels, and forming pools.

Private lands comprise about 70 percent of the area encompassed by the South River Resource Area. Private forestlands managed for timber production are harvested in accordance with state forest practice standards. Most private forest lands will continue to be intensively managed for timber production with final harvest on commercial economic rotations averaging 50 years.

One regeneration harvest totaling 146 acres on BLM-administered land in the South River Resource Area has been sold in the past five years. There are five sold, unawarded regeneration timber sales in the South River Resource Area totaling approximately 844 acres that may be harvested in the future. The level of regeneration harvest on the Roseburg District since the implementation of the RMP is at 26 percent of the acres that were assumed in the ROD/RMP. About six regeneration harvest timber sales totaling approximately 1,300 acres on BLM-administered land are anticipated to be implemented in the next five years. Combined, these sales represent approximately about nine percent of the acres available for potential regeneration harvest from the Matrix. These regeneration harvests would affect northern spotted owl dispersal and suitable habitat and marbled murrelet suitable habitat.

Commercial thinning and density management sales total about 1,100 acres over the past four years, with an additional 1,800 acres proposed within the next five years. This represents approximately eight percent of the potential acres available for commercial thinning or density management in the South River Resource Area.

IV. Monitoring

Monitoring would be done in accordance with the ROD/RMP, Appendix I (pg. 84, 190-91, and 195-99). Specific Resources to be monitored would include: Riparian Reserves; Water and Soils; Wildlife Habitat; Fish Habitat; and Special Status Species Habitat.

Chapter 5
List of Preparers, Agencies and Individuals Contacted or Consulted, and Literature Cited

This project was included in the Roseburg BLM quarterly planning update (Spring, 2004). A notice of decision will be published in *The News-Review*, Roseburg, Oregon, should any decision(s) be made to implement projects described in this analysis.

I. List of Preparers and Contributors

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Don Scheleen	Archaeology
Dawn White	Weeds

II. Agencies and Individuals Contacted or Consulted

No agencies or individuals were contacted or consulted during the preparation of this environmental assessment because of the programmatic nature of the analysis. Government agencies and other interested parties will be notified, however, and provided with a copy of this document upon its release.

III. Agencies and Individuals to Be Notified of Completion of the Analysis

Cow Creek Band of Umpqua Indians
Douglas Timber Operators, Robert Ragon, Executive Director
Bob Kinyon, Umpqua Basin Watershed Council
NOAA Fisheries
Oregon Department of Environmental Quality
Oregon Department of Fish and Wildlife
Oregon Natural Resources Council
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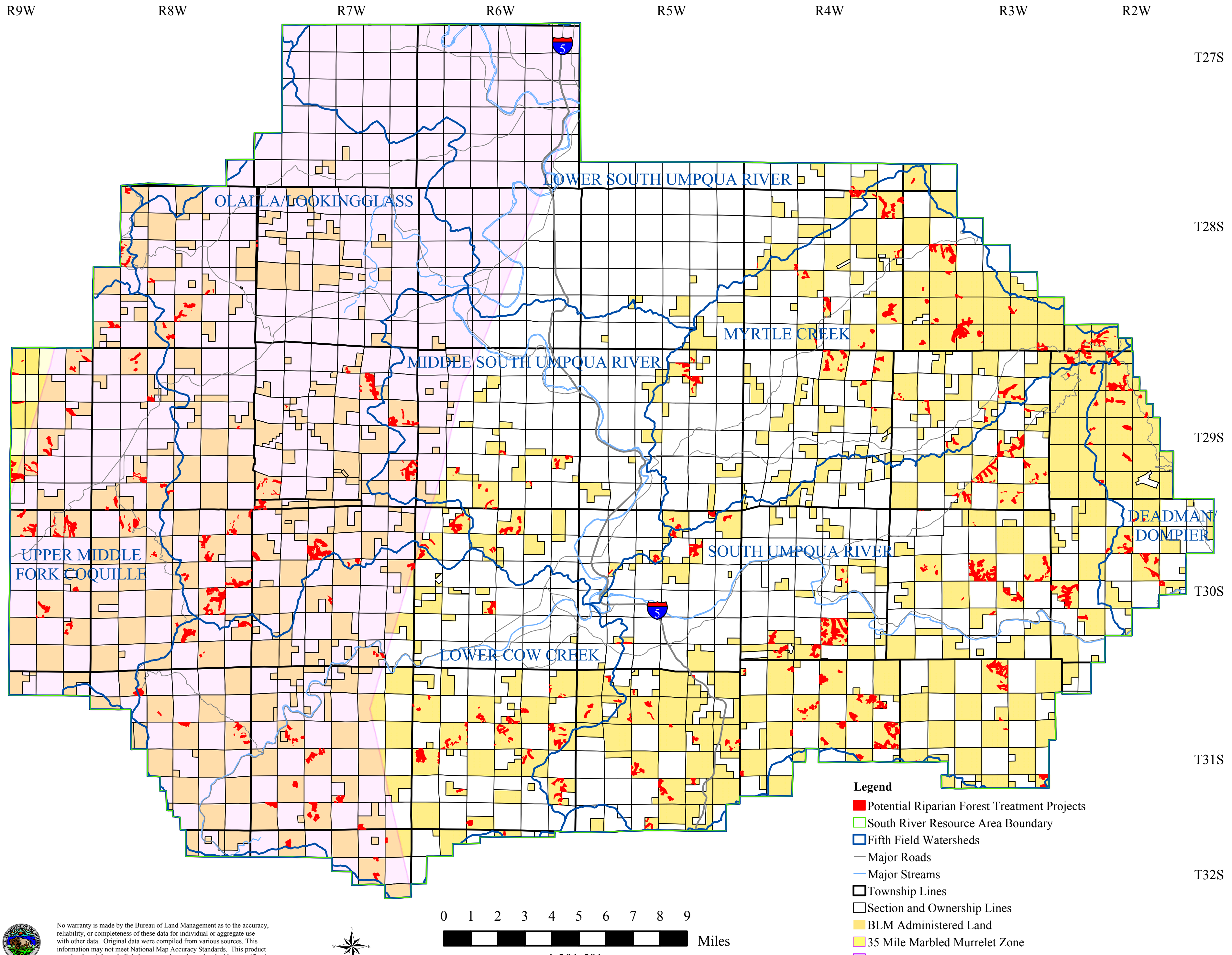
Appendix A

Maps of Preliminary Project Locations

Map 1. South River Resource Area Potential Riparian Forest Treatment Projects



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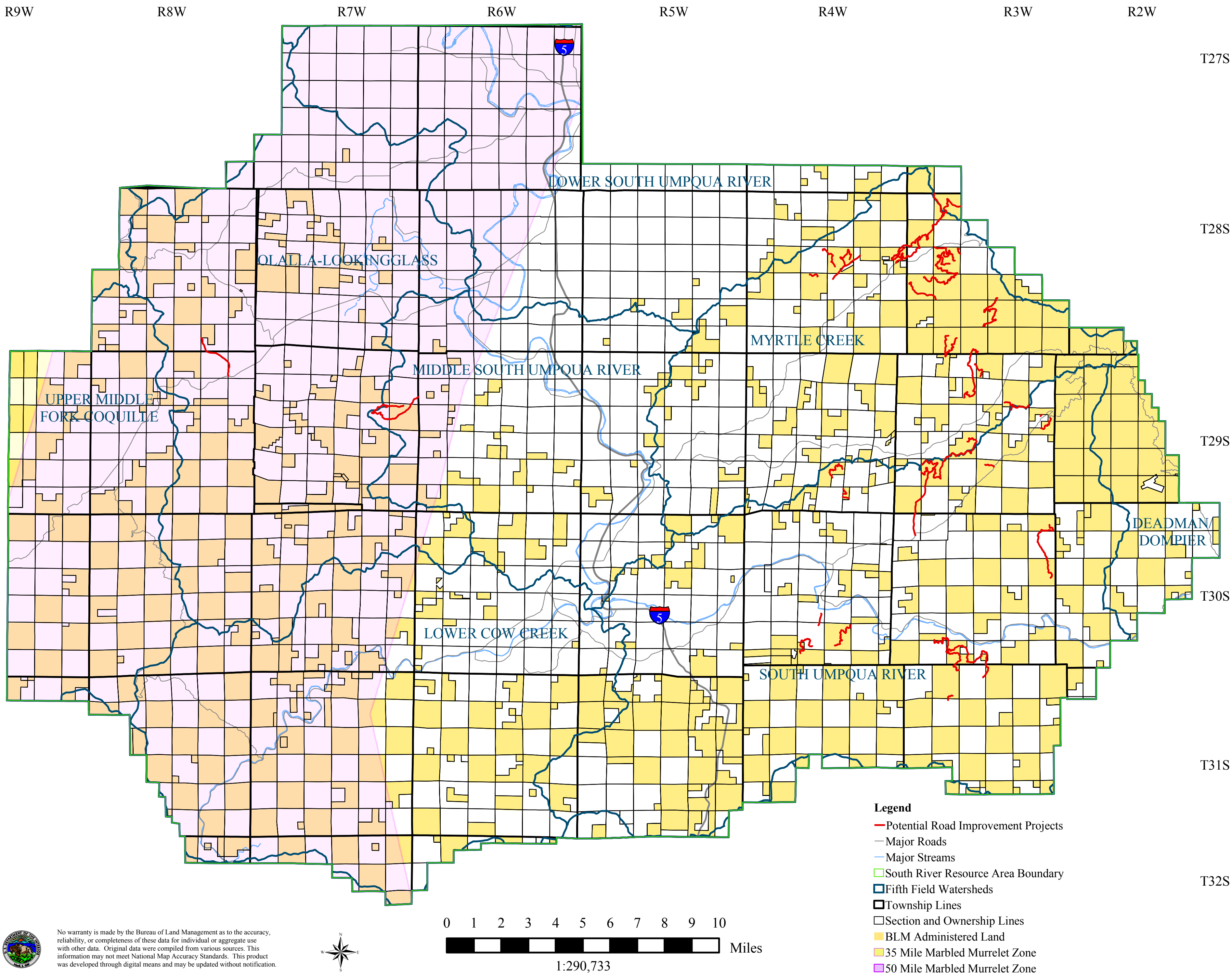
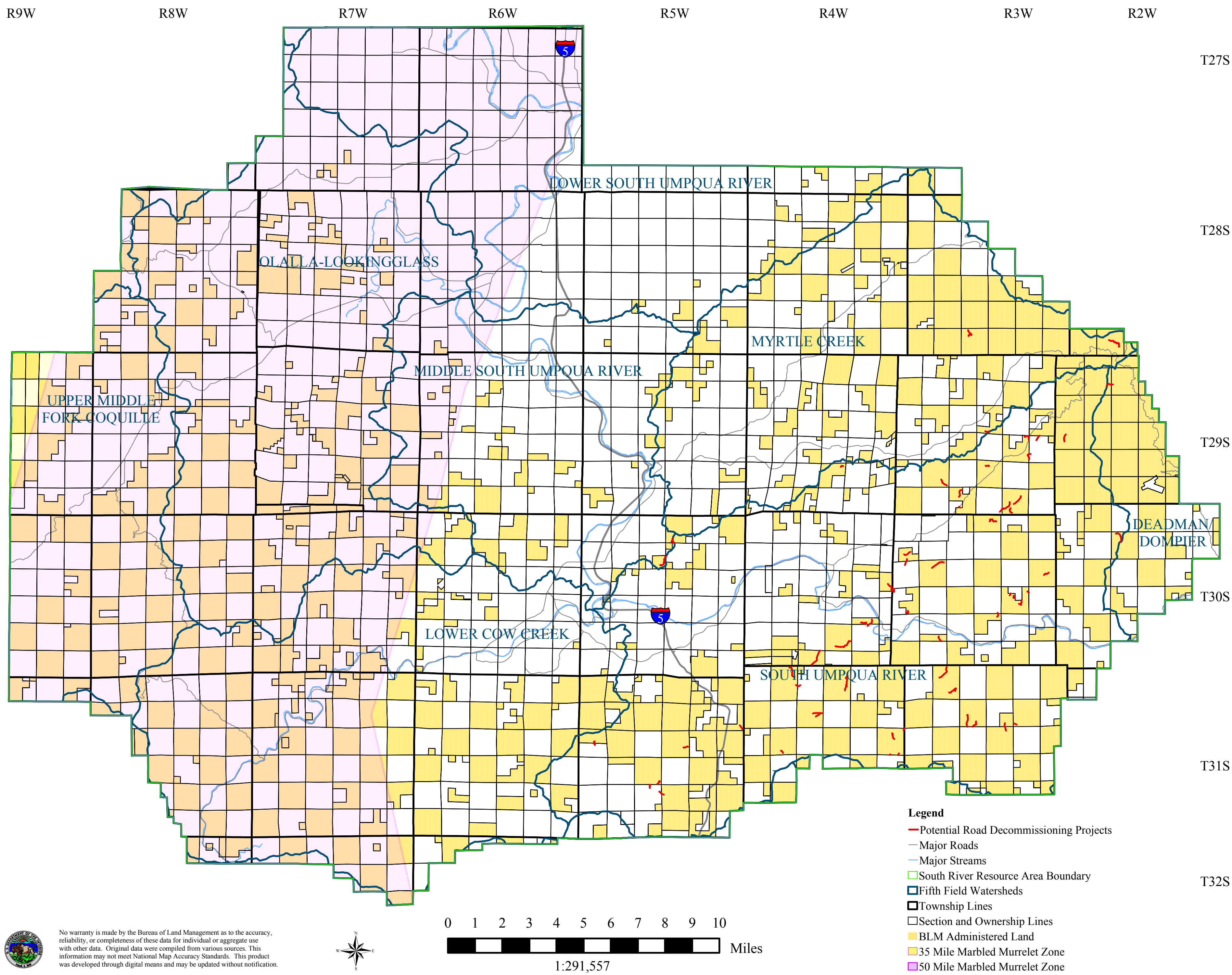
Map 2. South River Resource Area Potential Road Improvement Projects



Map 3. South River Resource Area Potential Road Decommissioning Projects



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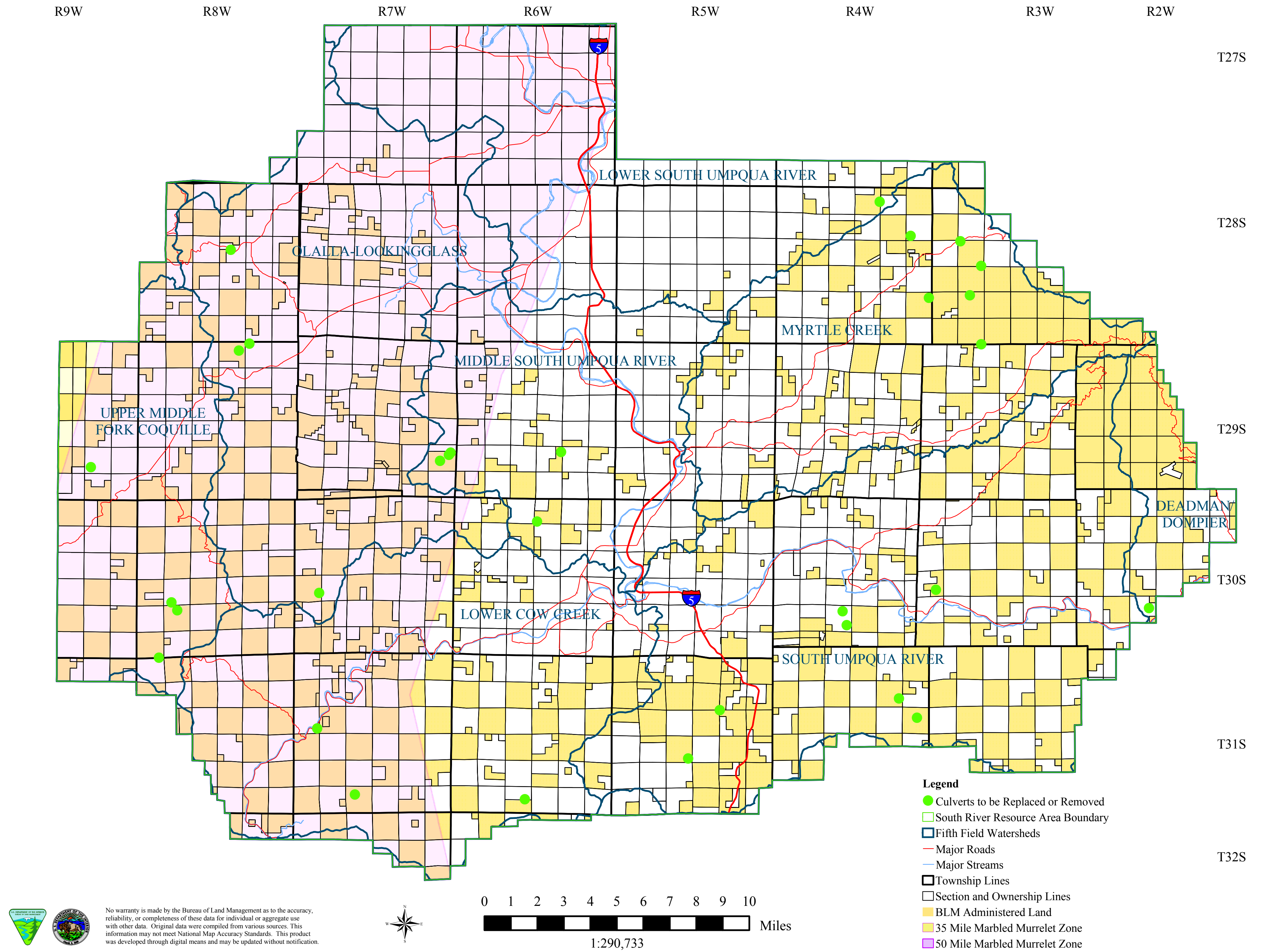
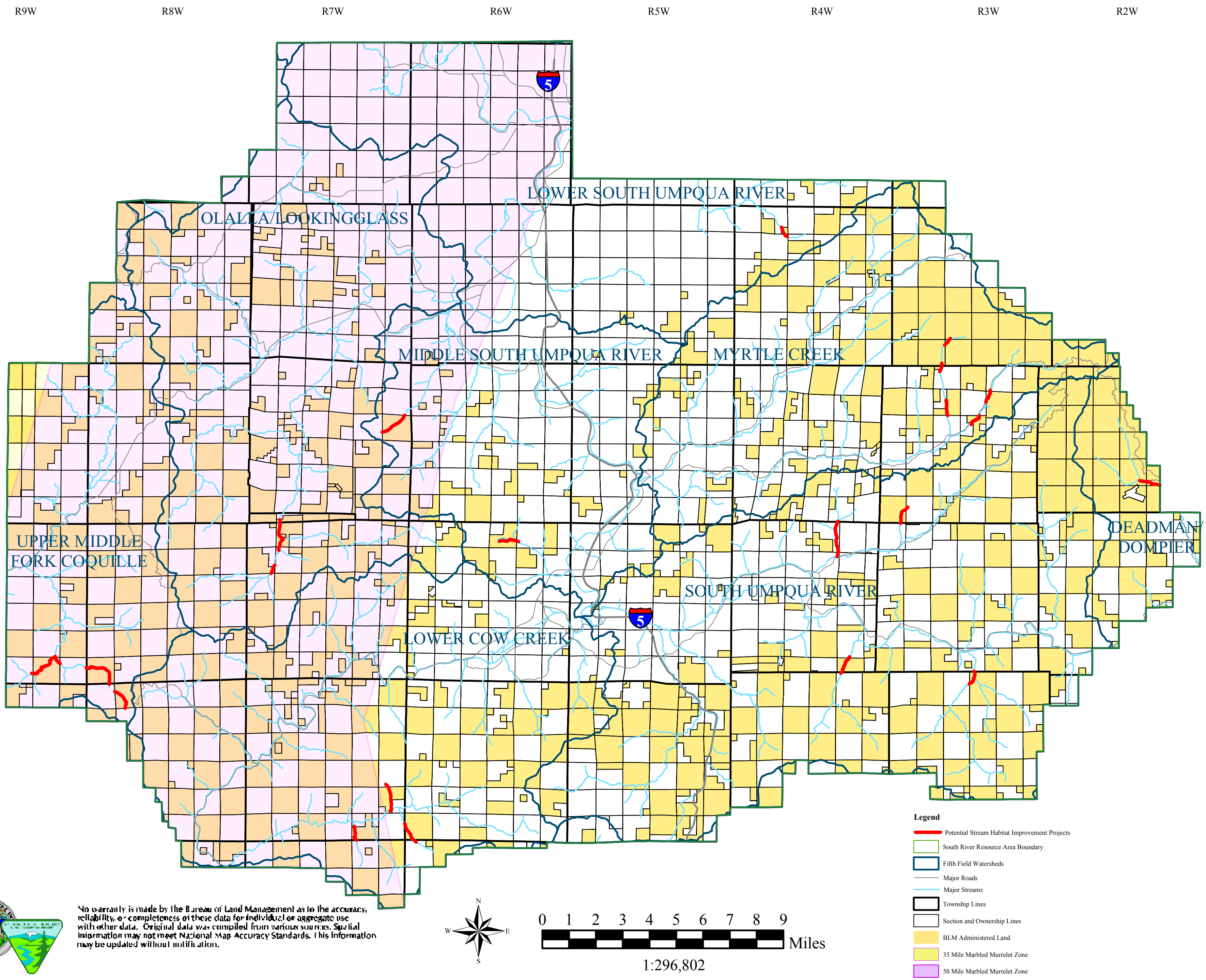
Map 4. South River Resource Area Culvert Replacement/Removal Projects



Map 5. South River Resource Area Potential Stream Habitat Improvement Projects



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Appendix B

Description of Proposed Projects

Stream Enhancement Projects

Stream Enhancement Projects have been identified as an important restoration element for the maintenance and recovery of listed salmonid fish species. The watersheds listed include the Tier 1 watersheds identified in the NWFP, watersheds with Bradbury (specific to the Umpqua Basin – need a citation here) rankings equivalent to or exceeding a medium priority, or watersheds determined valuable based on mixture of factors. Potential projects for the initial 5-10 year period are outlined in the table below.

Watershed	Stream	Location (T-R-S)	Access	Type	Length (miles)
Lower Cow Creek (Middle Creek[1])	Buck Ck	31-7-35	Good	LWD	0.5
Lower Cow Creek (Middle Creek[1])	Smith Ck	31-7-25	Good	LWD	0.75
Lower Cow Creek (Middle Creek[1])	Peavine Ck	31-6-31	Good	Gravel	0.5
South Umpqua[1]	Shively Ck – Lower	30-4-35	Good	LWD/Gravel	0.5
South Umpqua[1]	Wood Ck	30-4-3	Good	LWD/Gravel	0.75
South Umpqua[1]	Stouts Ck – Lower	31-3-3	Good	LWD	1.1
South Umpqua[1]	Fate Ck	29-3-31	Good	LWD	0.5
Deadman/Dompier[1,2]	Deadman Ck	29-2-26 & 27 – to the forks	Good	LWD/Gravel	0.75
Myrtle Creek	Weaver Ck	29-3-9 & 4	Good	LWD/Gravel	0.25
Myrtle Creek	Weaver Ck	28-3-32 & 33	Good	LWD/Gravel	1.0
Myrtle Creek	South Myrtle Ck	29-3-11	Good	LWD/Gravel	0.5
Myrtle Creek	South Myrtle Ck	29-3-15	Good	LWD/Gravel	0.4
Lower South Umpqua	Middle Fork S. Deer Ck.	28-4-5	Fair	LWD	0.3
Middle Fork Coquille	Twelvemile Ck	30-9-35	Good	LWD	1.2
Middle Fork Coquille	Dice Ck	30-8-31 & 31-8-5	Good	Gravel	1.5
Middle South Umpqua	Kent Ck	29-7-13	Good	LWD	1.0
Middle South Umpqua	Judd Ck	30-6-3	Good	LWD	1.0
Ollala/Lookingglass Creek	Ollala Ck	30-7-5	Good	LWD/Gravel	1.0
llala/Lookingglass Creek	Ollala Ck	30-7-7	Good	LWD/Gravel	0.25
TOTAL					**13.75**

1. Designated as a Tier 1 watershed.
2. Watershed Analysis Unit

Road Improvement Projects

For the purpose of analysis, road improvement projects were identified from drainages where fine sediment was above the threshold level of 12 percent fines in riffles, as identified in surveys by the Oregon Department of Fish and Wildlife. Once stream reaches with sediment impairment were identified, roads in need of potential drainage improvements were selected from the respective watershed analysis. In addition to the ODFW data utilization, some estimates were made for analysis purposes, based on percentages of the available amount of natural surface roads within 200 feet of a stream (e.g. Upper Middle Fork Coquille, Lower South Umpqua, Deadman/Dompier, and Lower Cow Creek Watersheds).

Watershed (5th Field)	Stream Name	Road Numbers	Mileage
South Umpqua	Days Creek	29-3-13.2, 29-3-13.1, 29-3-27.1	1.1
	Fate Creek	29-3-29.3A, 29-3-29.2A, 30-3-6.0	3.7
	Wood Creek	29-4-27.0A, 29-4-35.0B,D	1.9
	Johns Days	30-3-30.0B, 30-3-33.0A	2.2
	Stouts Creek	30-4-34.1H, 31-3-8.1B, 31-3-4.0	1.4
	Corn Creek	30-3-13.1	0.6
	Beals Creek	30-4-28.4B, 30-4-27.0A, 30-4-21.0	6.0
Lower South Umpqua	Unnamed	No specific roads identified but potential exists for up to 1 mile	1.0
Lower Cow Creek	Cedar Gulch Creek	No specific roads identified but potential exists for up to 3 miles	3.0
	Live Oak Creek	No specific roads identified but potential exists for up to 3 miles	3.0
Myrtle Creek	S. Myrtle Creek	29-3-15.1C, 29-3-11.4	1.0
	Weaver Creek	29-3-4.1C, 28-3-32.0A, 28-3-33.0B, 29-3-9.0AB	6.9
	Riser Creek	28-3-20.0A	1.7
	Lees Creek	28-4-28.0B, 28-4-15.0, 28-4-16.1B, 28-4-21.4	4.1
	Upper N. Myrtle Creek	28-4-13.3A, 28-4-13.2ABC, 28-3-5.0A, 28-4-13.4AB	8.5
	Buck Fork Creek	28-3-17.0, 28-3-17.1A, 28-3-17.2A, 28-3-8.1D	6.5
Middle South Umpqua	Kent Creek	29-7-12.0	0.5
Olalla Creek Lookingglass Creek	Little Muley Creek	29-8-2.0AB	2.4
Deadman/Dompier Creek	Deadman Creek	No specific roads identified but potential exists for up to 2 miles	2.0
	Dompier Creek	No specific roads identified but potential exists for up to 2 miles	2.0
TOTAL			59.5

Road Decommissioning

Potential road decommissioning projects were identified in the Roseburg District Transportation Management Plan (USDI, BLM 2002). These roads were listed as being in poor condition and were no longer needed to meet management objectives. Any planned decommissioning project would be fully coordinated with reciprocal right-of-way holders, as well as with the Douglas Forest Protective Association (DFPA), to obtain input of access needs. The table below lists these roads by 5th field watershed.

Watershed	Drainage name	Roads	Miles
South Umpqua	Canyon Creek	31-5-12.01A, 31-5-15.01A, 31-5-18.0A, 31-5-19.0B, 31-5-21.02A, 31-5-24.0B, 31-5-28.0A, 31-5-28.1B	2.0
South Umpqua	Coffee Creek	29-2-19.1A, 29-2-25.0A, 29-3-35.0B, 29-3-35.04A, 30-2-9.1A, 30-3-13.5A, 30-3-23.01C, 30-3-23.02B, 30-3-23.3B, 30-3-23.5B, 30-3-24.1B	3.4
South Umpqua	Days Creek	29-2-9.4A, 29-3-23.4A, 29-3-24.0B, 29-3-24.01A, 29-3-27.1B, 29-3-29.0A, 29-3-29.1A, 29-3-33.7A, 29-3-33.9A, 29-4-27.1A, 30-3-7.0A, 30-3-18.2A	2.9
South Umpqua	Shively Creek	30-4-22.0M, 30-4-26.2A, 30-4-26.3A, 30-4-27.1A, 30-4-28.3B, 30-4-35.0A, 31-4-3.2A, 30-4-3.3A, 31-4-4.4B, 31-4-9.5A, 31-4-9.6A, 31-4-13.4A, 31-4-13.3A, 13-4-13.4A, 31-4-24.0B	3.8
South Umpqua	O'Shea Creek	30-5-10.0A, 30-5-10.1A, 31-4-5.1A, 31-4-5.1B, 31-4-20.0B	1.6
South Umpqua	Stouts Creek	31-3-7.1C, 31-3-3.2D, 31-3-5.0A, 31-3-10.0A, 31-3-16.3C, 31-3-16.4B	2.4
South Umpqua	St. John Creek	29-3-33.4D, 29-3-35.0B, 30-3-3.1A, 30-3-17.1A, 30-3-23.5B, 30-3-29.1A, 30-3-30.3C, 30-4-23.0B	3.0
Lower Cow Creek	-	None Identified	-
Myrtle Creek	Upper S. Myrtle Creek	28-2-32.03A, 28-3-33.02A, 29-3-15.02D	1.4
Deadman/ Dompier Creek	-	None Identified	-
Middle South Umpqua River	-	None Identified	-
Olalla Creek - Lookingglass Creek	-	None Identified	-
Middle Fork Coquille	-	None Identified	-
Lower South Umpqua River	-	None Identified	-

Culvert Replacement/Removal Projects

Culvert projects have been identified within the resource area because (a) they limit the amount of habitat that fish species can seasonally move into or otherwise access or (b) they are at risk of failure, which would generate an unnatural input of fine sediment into stream and pose a threat to public safety. The table below describes culvert location by watershed and stream name, and the total miles of habitat for improved fish access would be 39.2 miles.

Watershed	Stream name	Road No.	Culvert No.	Project Type	Miles Of Habitat
Middle Fork Coquille	Holmes Creek	29-9-26.0	None	Replace	0.7
	Boulder Creek	31-7-19.0	1012	Replace	2.0
	Boulder Creek Trib.	30-8-29.2	1010	Replace	0.5
	Dice Creek	31-8-5.2	1011	Replace	0.5
Olalla Creek - Lookingglass Creek	Tenmile Creek	28-8-15.1	1001	Replace	2.5
	Little Muley Creek	29-8-2.1	1004	Replace	1.0
	Muns Creek	29-8-3.0	1016	Replace	3.0
	Wildcat Creek	30-7-18.0	3036	Replace	0.0
Middle S. Umpqua River	Rice Creek	29-7-24.0	3063	Replace	0.9
	Rice Creek	29-7-24.0	3064	Replace	0.8
	Rice Creek	29-7-24.0	3066	Replace	0.2
	Willis Creek	29-6-24.1	3083	Replace	0.5
	Judd Creek	29-6-34.2	3095	Remove	0.2
Myrtle Creek	N. Myrtle Creek	28-4-13.0	1021	Replace	2.0
	Buck Fork	28-3-17.0	3452	Replace	2.0
	Riser Creek	28-3-17.0	3017	Replace	4.5
	Slide Creek	28-4-34.0	5233	Replace	0.5
	Louis Creek	29-4-11.0	3018	Replace	1.2
	Weaver Creek	29-3-16.0	1020	Replace	2.5
South Umpqua	Lavadoure Creek	30-3-30.2	3321	Replace	1.0
	East Shively Creek	30-4-22.0	1031	Replace	1.0
	Beals Creek	30-4-21.0	12202	Replace	1.0
	Beals Creek	30-4-28.0	3314	Replace	0.5
	W.F. Canyon Creek	31-5-2.0	1027	Replace	2.5
	W.F. Canyon Creek	31-5-21.0	1029	Replace	2.5
	East Shively Creek	30-4-22.0	14292	Replace	0.1
Lower Cow Creek	Calf Creek	30-6-32.0	1013	Replace	0.5
	Audie Creek	32-8-1.0	1014	Replace	1.5
	S.F. Middle Creek	31-6-33.0	1044	Replace	2.0
	Middle Creel	31-6-22.0	15196	Replace	
Deadman/Dompier Creek	Salt Creek	30-2-28.0	1037	Replace	0.3
Lower S. Umpqua River	S.F. Deer Creek	28-4-8.1	4130	Replace	0.0

Appendix C

Representative Watershed Characteristics

Watershed or Watershed Analysis Unit	Deadman/ Dompier	Myrtle Creek	Lower Cow Creek	Lower South Umpqua	Upper Middle Fork Coquille	Olalla Creek – Lookingglass Creek	Middle South Umpqua River	South Umpqua River
General Characteristics								
Area in Acres	25,757	76,036	118,340	110,419	67,207	103,109	59,397	141,455
Percent administered by BLM	42	41	39	4	39	27	13	41
Tier 1 Key Watershed	Yes	No	Middle Creek subwatershed	No	No	No	No	Upriver from Days Creek
District Restoration Priority Ranking[1]	1	2	1	3	3	2	3	1
Road Information								
Total Road Miles	141	523	779	626	428	640	422	996
Road Density (Miles per Square Mile) for All Ownerships	5.5	4.4	4.9	5.3	5.3	4.0	4.5	4.6
BLM Road Miles	88	204	254	21	180	167	43	330
Stream Crossings on BLM Roads	181	685	964	32	431	531	116	852
Miles of BLM Roads Within 200 Feet of a Stream	83	192	244	14	160	153	41	297
Miles of BLM Natural Surface Roads Within 200 Feet of a Stream	4	16	14	1	26	18	3	41

1 From Table 5-1 in the Restoration Strategy and Action Plan for the Roseburg District Bureau of Land Management

Watershed or Watershed Analysis Unit	Deadman/ Dompier	Myrtle Creek	Lower Cow Creek	Lower South Umpqua	Upper Middle Fork Coquille	Olalla Creek Lookingglass Creek	Middle South Umpqua River	South Umpqua River
Instream Habitat								
Total Stream Miles	193	875	1,165	458	582	725	581	1,407
Total Miles of Anadromous Fish Bearing Streams	9	106	161	119	2	179	108	93
Miles of Fish Bearing Streams on BLM-managed Land	28	84	141	5	43	58	18	186
Streams With ODFW Survey Data	8 for 19 miles, covering 10 percent of all streams	10 for 74 miles, covering 8 percent of all streams	22 for 70 miles, covering 6 percent of all streams	3 for 18 miles, covering 4 percent of all streams	9 for 26 miles, covering 4 percent of all streams	8 for 43 miles covering 6 percent of all streams	8 for 31 miles, covering 5 percent of all streams	27 for 80 miles, covering 6 percent of all streams
Aquatic Habitat Rating (AHR) on Streams with ODFW Survey Data	18 percent poor and 82 percent fair	35 percent poor, 63 percent fair and 2 percent good	10 percent poor, mostly in Middle Cr, 87 percent fair, 3 percent good	8 percent poor and 92 percent fair	56 percent poor and 44 percent fair	20 percent poor, 57 percent fair and 23 percent good	29 percent poor, 68 percent fair 3 percent good	27 percent poor, 69 percent fair and 4 percent good
Spawning/Rearing Habitat for anadromous fish	Limited by waterfall on Deadman Cr.	Rearing in Weaver and upper North Myrtle, spawning and rearing in Slide and Riser Cr	Spawning in Martin Cr	Spawning and rearing in Deer Cr	Limited mainly to the Middle Fork Coquille River by waterfall	Spawning and rearing in Thompson Cr	Limited to small tributaries of South Umpqua River	Spawning and rearing in Days Cr and its tributaries
Fish Passage Barriers								
Natural Barriers	160 foot fall on Deadman Cr	NA	Union Cr	NA	22 foot fall, 1.5 miles upstream of confluence of Middle Fork Coquille and Twelvemile Cr	NA	NA	Falls on Coffee Cr, Corn Cr, and East Fork Stouts Cr.
Man-made Barriers	One culvert	Six culverts	Three culverts	One culvert	Five culverts	Dam on Berry Cr and four culverts	Dams on Clark Branch and E Fork of Willis Crs and five culverts	Dam on the West Fork Canyon Cr and six culverts

Riparian Vegetation Data								
Acres of Riparian Reserves in 30-60 Year Age Class on BLM-administered land	373	1325	482	35	1,325	1,228	481	2,371
Total Acres of Riparian Reserves in Late-Successional Age Class (At Least 80 Years Old)	2,099	6,573	10,602	348	3,689	3,486	1,036	11,828
Percent of Riparian Reserves in Late-Successional Age Class (At Least 80 Years Old)	49	52	60	34	35	40	39	54
Water Quality Conditions								
Streams With Temperatures Above17.8 Degree Celsius	2	8	8	2	4	1	2	8
Special Status Species Habitat on BLM-administered Land								
Number of Occupied Northern Spotted Owl Sites (2002 data)	3	7	19	0	3	12	0	34
Acres of Northern Spotted Owl Suitable Habitat	5,134	15,090	21,932	1,408	9,891	13,962	1,898	32,663
Acres of Northern Spotted Owl Dispersal Habitat	No data available from watershed analysis	15,263	16,686	749	8,281	No data available from watershed analysis	No data available from watershed analysis	45,586
Acres of Suitable Northern Spotted Owl Habitat in Critical Habitat Units (CHU-ID)	2,564	809	14,164 (OR-62) 3,807 (OR-63)	0	3,678	1,089 (OR-61) 5,516 (OR-62)	0	4,215 (OR-29), 1,097 (OR-31), 14,060 (OR-32), 1,366 (OR-63)
Number of Occupied Marbled Murrelet Sites	Not Applicable	Not Applicable	0	Not Applicable	1	2	Not Applicable	Not Applicable
Acres of Marbled Murrelet Habitat	Not Applicable	Not Applicable	11,390	Not Applicable	7,863	12,152	Not Applicable	Not Applicable
Acres of Suitable Marbled Murrelet Habitat in Critical Habitat Units (CHU-ID)	Not Applicable	Not Applicable	0	Not Applicable	1,451(OR-06-d)	2,725(OR-06-d)	Not Applicable	Not Applicable
Acres of Suitable Bald Eagle Habitat Within 1 Mile of Major Water Systems	0	0	3,329	0	278	0	0	1,799

Appendix D

Presence or Absence of Preferred Habitat for Special Status Species in the Proposed Project Areas

			Preferred Habitat Present in Project Area		
Species	**Status**	**Preferred Habitat** [3,4,5,7,8,9,10,11]	**Riparian Projects**	**In-Stream Projects**	**Culvert and Road Projects**
Northern Spotted Owl[3] (*Strix occidentalis caurina*)	FE	Forest stands generally 80 years +. Occasionally found in younger forest stands that have remnant trees.	No	Yes	No[1]
Marbled Murrelet[3] (*Brachyramphus marmoratus*)	FT	Forest stands generally 80 years + in Zones I and II in Southwest Oregon.	No	Yes	No[1]
Bald Eagle[3] (*Haliaeatus leucocephalus*)	FT	Forest stands generally 80 years + and within 1-2 miles from major rivers, lakes and reservoirs.	No	Yes[2]	No[1]
American Peregrine Falcon[3] (*Falco peregrinus anatum*)	BS	Rocky cliffs or outcrops in open or forested areas.	No	No	No
Lewis' Woodpecker[3] (*Melanerpes lewis*)	BSO	Riparian areas with large cottonwoods, logged or burned over ponderosa pine forests, or open oak or oak-conifer woodland.	No	No	No
Northern Goshawk[3] (*Accipiter gentilis*)	BSO	Forest stands generally 80 years +, mature deciduous and evergreen forest stands. Nests on largest trees of stand, often near water.	No	Yes	No[1]
Oregon Vesper Sparrow[3] (*Podecetes gramineus affinis*)	BSO	Open grassland areas.	No	No	No
Purple Martin[3,4] (*Progne subis*)	BSO	Along rivers and other water bodies, old burned areas in forest stands generally 80 years +, nest in abandoned woodpecker cavities.	No	Yes	No
Northwestern Pond Turtle[3] (*Clemmys marmorata marmorata*)	BSO	Larger mountain and valley streams with deep pools, deep sandy soils close to stream.	Yes	Yes	Yes
Columbian white-tailed deer[3] (*Odocoileus virginianus leucurus*)	BSO	Known breeding population restricted to Roseburg and vicinity, riparian in oak savannah, grasslands.	No	No	No
Pacific Fisher[3] (*Martes pennanti pacifica*)	BSO	Late-successional forests with multiple canopy layers, large down wood, large diameter snags.	No	No	No
Townsend's big-eared bat[3] (Corynorhinus townsendii)	BSO	Abandoned caves, bridges, or natural caves	No	No	No
Oregon Shoulderband Snail[5] (*Helminthoglypta hertleini*)	BSO	Basalt talus, under rocks and woody debris in moist forests and shrubby riparian corridors.	Yes	Yes	Yes
Chace Sideband Snail[5] (*Monadenia chaceana*)		Habitat is similar to that utilized by the Oregon Shoulderband Snail	Yes	Yes	Yes
Rotund Lanx Snail[5] (*Lanx subrotundata*)	BSO	Aquatic, large river systems	No	No	No
Green Sideband Snail[5] (*Monadenia fidelis flava)*	BSO	Deciduous trees and brush, western side of Resource Area, forest floor litter.	Yes	Yes	Yes
Travelling Sideband Snail[5] (*Monadenia fidelis celeuthia*)	BSO	Suspected	U	U	U[6]
Crater Lake Tightcoil Snail[5] (*Pristiloma arcticum crateris*)	BSO	Rocky Talus areas in Klamath Province and talus and down woody material in western Cascade Province.	Yes	Yes	Yes
Oregon Giant Earthworm[11] *(Driloleirus macelfreshi)*	BSO	Suspected- Deep valley soils, Willamette Valley.	U	U	U
Insular Blue Butterfly[8] (Plebejus saepiolus insulanus)	BSO	Moist meadows and streamsides from high transition zone to Alpine Zone meadow and Tundra.	No	No	No
Harlequin Duck[3,9] (*Histrionicus histrionicus*)	BAO	Clean fast flowing streams with abundance of riffles, rapids, gravel, coble, and boulders. Nests in riparian zone and often hidden in rock cavities, on the ground, on logs, in hollow trees, snags, undercut streambanks, under woody debris.	No	Yes[7]	Yes[7]
Western Least Bittern[3] (*Ixobrychus exilis hesperis*)	BAO	Cattail or hardstem bulrush marshes.	No	No	No

			Preferred Habitat Present in Project Area		
Species	**Status**	**Preferred Habitat** [3,4,5,7,8,9,10,11]	**Riparian Projects**	**In-Stream Projects**	**Culvert and Road Projects**
White-tailed Kite (*Elanus leucurus*)	BAO	Open grassy areas for foraging, nest in	No	No	No
Cascade Torrent Salamander[3] (*Rhyacotriton cascadae*)	BAO	Cascades area, cold and clear springs, headwater streams associated with old-growth forest.	No	No	No
Cascades Frog[3] (*Rana cascadae*)	BAO	Above 2000 feet, small pools adjacent to streams, meadows or flood plain	No	No	No
Del Norte salamander[3] (*Plethodon elongatus*)	BAO	Deep rocky talus components in forest, along road cutbanks associated with forested talus.	Yes	Yes	Yes
Foothill yellow-legged frog[3] (*Rana boylii*)	BAO	Deep slow moving water in perennial streams with rocky, gravelly, or sandy bottoms.	No	Yes	Yes
Northern red-legged frog[3] (*Rana aurora aurora*)	BAO	Marshes, ponds and slow moving streams with little or no flow with submerged vegetation.	No	No	No
Tailed frog[3] (*Ascaphus truei*)	BAO	Cold fast flowing low sediment streams usually in higher elevations.	Yes	Yes	Yes
Common Kingsnake[3] (Lampropeltis getula)	BAO	Moist river valleys, thick vegetation, below 1600 feet.	No	No	No
Fringed Myotis[3] (*Myotis thysanodes*)	BAO	Roost under loose bark of large diameter snags, and live trees, colonies in caves, mines, buildings.	No	Yes	Yes
Brazilian free-tailed bat[10] (*Tadarida brasiliensis*)	BAO	Caves, mines, hollow trees usually at lower elevations	No	No	No

1. Generally not present but may be present at some project areas.
2. Only if riparian area is within 1 mile of major water system (South Umpqua River or Cow Creek)
3. Marshall, D.B., M.W. Chilcote, and H. Weeks. 1996. Species at risk: sensitive, threatened, and endangered vertebrates of Oregon. 2nd. Edition. Oregon Department of Fish and Wildlife, Portland, OR.
4. Copley, D., D. Fraser, and J. C. Finlay. 1999. Purple martins, *Progne subis*: A British Columbian success story, Canadian Field Naturalist 113(2):226-229.
5. Duncan Nancy. 1999. Editor. Management Recommendations for Survey and Manage Terrestrial Mollusks. Version 2.0. BLM-IM-OR-200-003; Frest, T.J., and E. J. Johannes. 2000. A baseline mollusk survey of southwestern Oregon, with emphasis on the Rogue and Umpqua River drainages. Year 2000 Report for the Oregon natural heritage Program, October 31, 2000. pp. 213-215.
6. Unknown
7. Although some of these components would be present in some project areas the current distribution and known locations (DOWLAN, S. 1996. The breeding status and distribution of Harlequin Ducks in Oregon: a summary of observations and survey efforts. Oregon Birds 22:42-47) of harlequin duck in Douglas County, OR makes it an unlikely species to encounter.
8. Scott, J.A. 1986. The Butterflies of North America. A natural history and field guide. Stanford University Press, Stanford California, pp. 408-409.;
9. Thompsom, J., R. Goggans, P. Greenle, and Steve Dowlan. 1993. Abundance, distribution and habitat associations of the harlequin duck (*Histrionicus histrionicus)* in the Cascade Mountains, Oregon, 1993. Report to Oregon Dept. of Fish and Wildlife, Willamette National Forest, Mt. Hood National Forest, and Bureau of Land Management, Salem District.
10. Csuti, B., A. J. Kimerling, T. A. O'Neil, M.M. Shaughnessy, E.P. Gaines, and M. M.P. Huso.1997. Distribution, habitat, and natural history. Atlas of Oregon wildlife, Oregon State University Press, Corvallis, Oregon., p. 352.
11. http://www.cnr.usu.edu/faculty/drosenberg/earthworm.html

Appendix E
Critical Elements of the Human Environment

The following elements of the human environment are subject to requirements specified in statute, regulation, or executive order. These resources or values are either **not present** or **would not be affected by the proposed actions or alternative**, unless otherwise described in this EA.

ELEMENT	NOT PRESENT	NOT AFFECTED	IN TEXT
Air Quality		X	
Areas of Critical Environmental Concern	X		
Cultural Resources		X	X
Environmental Justice		X	
Farm Lands (prime or unique)		X	X
Floodplains		X	
Invasive, Non-native Species		X	X
Native American Religious Concerns	X		
Threatened or Endangered Wildlife Species			X
Threatened or Endangered Plant Species			X
Wastes, Hazardous or Solid	X		
Water Quality - Drinking/Ground		X	X
Wetlands/Riparian Zones		X	
Wild & Scenic Rivers	X		
Wilderness	X		
Visual Resource Management		X	X